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Wisconsin's 1968 timber resource--

A PERSPECTIVE

JOHN S. SPENCER, JR.
and HARRY W. THORNE

NORTH CENTRAL FOREST EXPERIMENT STATION
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U.S. DEPARTMENT OF AGRICULTURE

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Spencer, John S., Jr., and Harry W. Thorne.

1972. Wisconsin's 1968 timber resource — a perspective. North Cent. For. Exp. Stn., St. Paul, Minn. 80 p., illus. (USDA For. Serv. Resour. Bull. NC-15)

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FOREWORD

This report presents Wisconsin's timber resource in 1968 as found by the third Forest Survey of Wisconsin. It provides forest area, timber inventory, growth, mortality, removals, and forest industry statistics. It compares some of these findings with those of the 1956 survey.

The third Wisconsin Forest Survey was part of the continuing program authorized by Congress in the McSweeney-McNary Forest Research Act of 1928 to maintain a current inventory of the Nation's timber supply. The survey was organized and conducted jointly by the North Central Forest Experiment Station and the Wisconsin Department of Natural Resources. Each agency completed the aerial photo interpretation and field work for approximately half of the State. All work was done under the broad guidelines of the Department of Natural Resources Forest Advisory Council, a group composed of many public and private foresters within the State. The Eastern Region of the USDA Forest Service provided timber resource data for the two National Forests in Wisconsin. The Wisconsin Department of Highways, the Wisconsin Department of Natural Resources, and the Agricultural Stabilization and Conservation Service all provided aerial photographs used in the survey.

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HIGHLIGHTS

Forest Area

Forest land covers 43 percent of the State's land area or 14.9 million acres. In 1956 the area was 15.2 million acres.

Commercial forests account for 14.5 million acres compared with 14.9 million acres in 1956.

Poletimber stands constitute 45 percent of the commercial forest, more than any other stand-size class. In 1956, sapling and seedling stands dominated with 38 percent of the total.

Farmers, private individuals, and corporations other than forest industries own 60 percent of the commercial forest.

The aspen-birch type (4.2 million acres) and the maple-beech-birch type (3.5 million acres) embrace the largest areas of commercial forest of all forest types.

Timber Volume

Growing-stock volume on commercial forest land was 11.0 billion cubic feet in 1968, compared with 8.4 billion cubic feet in 1956.

Volume in sawtimber trees increased from 15.8 billion board feet in 1956 to 21.8 billion board feet in 1968.

The two northern Forest Survey units contain 68 percent of the growing-stock volume and 61 percent of the sawtimber volume.

Hardwoods account for three-fourths of the growing-stock volume.

Aspen is the chief species, followed by northern red oak and sugar maple.

Average volume per acre of growing stock is 756 cubic feet (9.6 cords).

Farmers and other individuals own 60 percent of the growing-stock volume.

In addition to the above growing-stock volume, there are 1.1 billion cubic feet in nongrowing-stock trees, principally rough trees.

Growing-stock inventory is projected to increase to 17.8 billion cubic feet in 1998.

Stand Conditions

Net annual growth on growing-stock trees was 500 million cubic feet in 1967, 30 percent higher than in 1956.

The net annual growth rate of growing stock was 4.5 percent of inventory volume.

Mortality of growing-stock trees amounted to 60 million cubic feet, or 0.5 percent of inventory.

Sixty-five percent of the commercial area is medium-stocked or better with growing-stock trees. Only 4 percent of the area is nonstocked with these trees.

Seventy-six percent of the commercial area is capable of growing trees 50 feet and taller at age 50, but only 19 percent is capable of growing trees 70 feet and taller at the same age.

Fifty percent of Wisconsin's forest area supports commercial stands less than 40 years old.

Timber Use

The number of primary wood-using plants in the State dropped from 1,753 in 1956 to 898 in 1967.

Wisconsin produced more paper (2.3 million tons) in 1967 than any other State, accounting for 11 percent of the country's total production.

Nearly half of the wood to operate Wisconsin's pulpmills is from out of State.

Timber products output of pulpwood in 1967 was 112 million cubic feet, up 52 percent from the 74 million cubic feet in 1956.

Sawmills account for 91 percent (818) of the total number of primary wood-using plants.

Lumber production in 1967 amounted to 286 million board feet, about the same as in 1956.

Growing-stock removals in 1967 were 233 million cubic feet, about half of the volume of net annual growth.

Growing-stock removals are projected to nearly double by 1998, reaching 426 million cubic feet.

Figure 1. – Generally flat topography, large expanses of hardwood commercial timber, lakes surrounded by marshes and lowland conifers, and fertile fields – the face of much of rural Wisconsin. Glaciers from a long-past ice age etched most of the State into its present landforms. (Photo courtesy of Wisconsin Department of Natural Resources.)

WISCONSIN'S 1968 TIMBER RESOURCE — A PERSPECTIVE

John S. Spencer, Jr. and Harry W. Thorne

THE FOREST

Wisconsin, perhaps best known for its sparkling waters and abundant dairy products, is a verdant State (fig. 1). Forest land in 1968 covered 43 percent (14.9 million acres) of the total land area. Most (14.5 million acres) of this is classed as commercial forest — land capable of growing industrial wood and not reserved from timber harvesting. These commercial forests supported 11.0 billion cubic feet in growing-stock trees, and 21.8 billion board feet in sawtimber-sized trees in 1968.

The above figures represent the latest situation in Wisconsin's forests which, like all living things, are in a perpetual state of change. The following few paragraphs suggest the extent of change that has occurred and put in better perspective the information in the rest of the report.

Her forests have always figured prominently in Wisconsin's past, and undoubtedly will be important in her future as well. Jean Nicolet, the first known non-Indian to visit the area now called Wisconsin, must have thought the forest endless in 1634. The settlers, who came after the Black Hawk War in 1832, must have thought so too, and probably cursed the sea of green as they undertook the task of leveling this barrier to their chosen vocation of raising crops and livestock. Lumbermen, however, began to make use of the timber and by 1860 there were 40 operating sawmills in Sheboygan, Manitowoc, and Kewaunee Counties alone. Most of the lumber produced in these mills found a ready market in burgeoning Milwaukee and Chicago after shipment by water down Lake Michigan.

Settlement of northern Wisconsin and much of the Midwest generally occurred after the Civil War, producing an insatiable demand for lumber and other wood products. As lumbering spread westward across the State to help meet this demand, Wisconsin entered the boom days of logging which were to peak about 1900. During this period great expanses of cutover land were left behind the faller's crosscut saw as generally only the inaccessible or unmerchantable stands were spared. High quality eastern white pine was especially prized.

The residue of dry logging slash fueled the many fires that later swept the cutover timberlands and sometimes spread to unlogged areas as well. Such fires were usually of little concern unless life or property were threatened. The calamitous Peshtigo Fire of 1871, in which more than 1,200 persons died and much of six counties in northeastern Wisconsin was burned, was plain, if unheeded, testimony to the seriousness of forest fire and the impropriety of contemporary logging practices.

Lumber companies sold some of their cutover land to settlers and land speculators. Much of it, however, simply became tax delinquent as the companies moved away to unlogged forests. The closing of mills and resulting loss of employment in woods and mill, together with a sharp reduction in tax revenues, spelled economic disaster for many communities.

Fortunately, man and nature both helped change the dismal picture across the State, until now the forest stands phoenixlike where once there were only ashes and blackened snags or poor trees. For his part, man passed legislation promoting forest management and fire control; established National, State, and county forests; provided special means for taxing forest properties; and planted trees. For hers, nature greened the barren landscapes with vegetation — annual and perennial weeds, brush, and trees. Trees ultimately triumphed on many

sites, although often they were not the same species as their immediate predecessors. Aspen, one of the postfire species, was especially prolific and was considered a virtually useless weed by many until recently.

Today's youthful forest is different in many ways from the one it replaced. Because it is a dynamic system, today's forest is even different from the one a decade ago. Some measure of this recent change can be seen by comparing 1956 and 1968 survey data.

Forty-Three Percent of State Is Forested

The areas of forest land (14.9 million acres) and commercial forest land (14.5 million acres) mentioned earlier represent slight declines from the 1956 areas of 15.2 million acres and 14.9 million acres,[1] respectively. This minor general decline is part of the long-term downward trend in forest areas throughout much of the country as forest land continues to be diverted to other uses to serve the desires of a growing population.

The decline in commercial forest area was not constant throughout the State, and slight increases even occurred in the easternmost Forest Survey Units as seen below:

Forest Survey Unit	*Survey Year* 1956	1968	*Area Change Since 1956*
	(Thousand acres)		*(Thousand acres)*
Northeast	4,045	4,062	+ 17
Northwest	5,459	5,246	-213
Central	2,948	2,832	-116
Southwest	1,545	1,493	- 52
Southeast	871	904	+ 33
Total	14,868	14,537	-331

The two northern Forest Survey Units contain two-thirds of the State's commercial forest area (fig. 2). Bayfield County, on the shores of Lake Superior, contains the largest area of commercial forest among counties in the State – 777,300 acres.

In addition to commercial forests there were 408.6 thousand acres of noncommercial forest land in the State in 1968. Most (374.4 thousand acres) of this was unproductive and inherently incapable of growing industrial wood, and the remainder (34.2 thousand acres) was land withdrawn from commercial timber use, such as State and county parks. This noncommercial land is highly important for its recreational, esthetic, wildlife habitat, and watershed potential even though it yields few, if any, industrial timber products.

Farmers, private individuals, and corporations other than forest industries own 60 percent of the State's commercial forest land; farmers alone own one-third of the total. Public owners account for 31 percent of the area of commercial forests, and forest industries own the remaining 9 percent. Among public owners, counties and municipalities own the largest share of the total (16 percent) followed by National Forests (9 percent).

The pattern of ownership has changed little since 1956 except for a shift of land from Federal ownership other than National Forests to forest industry ownership. This was largely the result of the transfer between surveys of land administered by the Bureau of Indian Affairs in Menominee County to ownership by Menominee Enterprises, a business corporation owned by members of the Menominee Indian tribe.

Area of Poletimber Stands is Largest

Poletimber stands comprise 45 percent of the commercial forest, more than any other stand-size class. In 1956, sapling and seedling stands were the largest class with 38 percent of the commercial area. Area of sawtimber and poletimber stands increased between surveys, but area of nonstocked commercial forest decreased drastically (table 1).

The large drop in nonstocked areas is misleading because an unknown amount of it is not real, physical change. Improved sampling procedures used in the latest survey have provided a more sensitive estimate of established seedling trees. Had the newer techniques been used in 1956, some of the commercial forest classed as nonstocked then undoubtedly would have been classified as seedling stands. The changes found, then, understate the reduction in sapling and seedling stands and overstate by the same amount the change in nonstocked area. Unfortunately, this changed procedure precludes making any meaningful comparisons of nonstocked areas between surveys. It seems certain, however, that the nonstocked area did decline between surveys because of natural regeneration and tree planting. Much of the latter has been

[1] *Published 1956 areas have been adjusted for boundary changes between Forest Survey Units and to aline the 1956 estimates more closely with definitions of land classification used in the 1968 survey.*

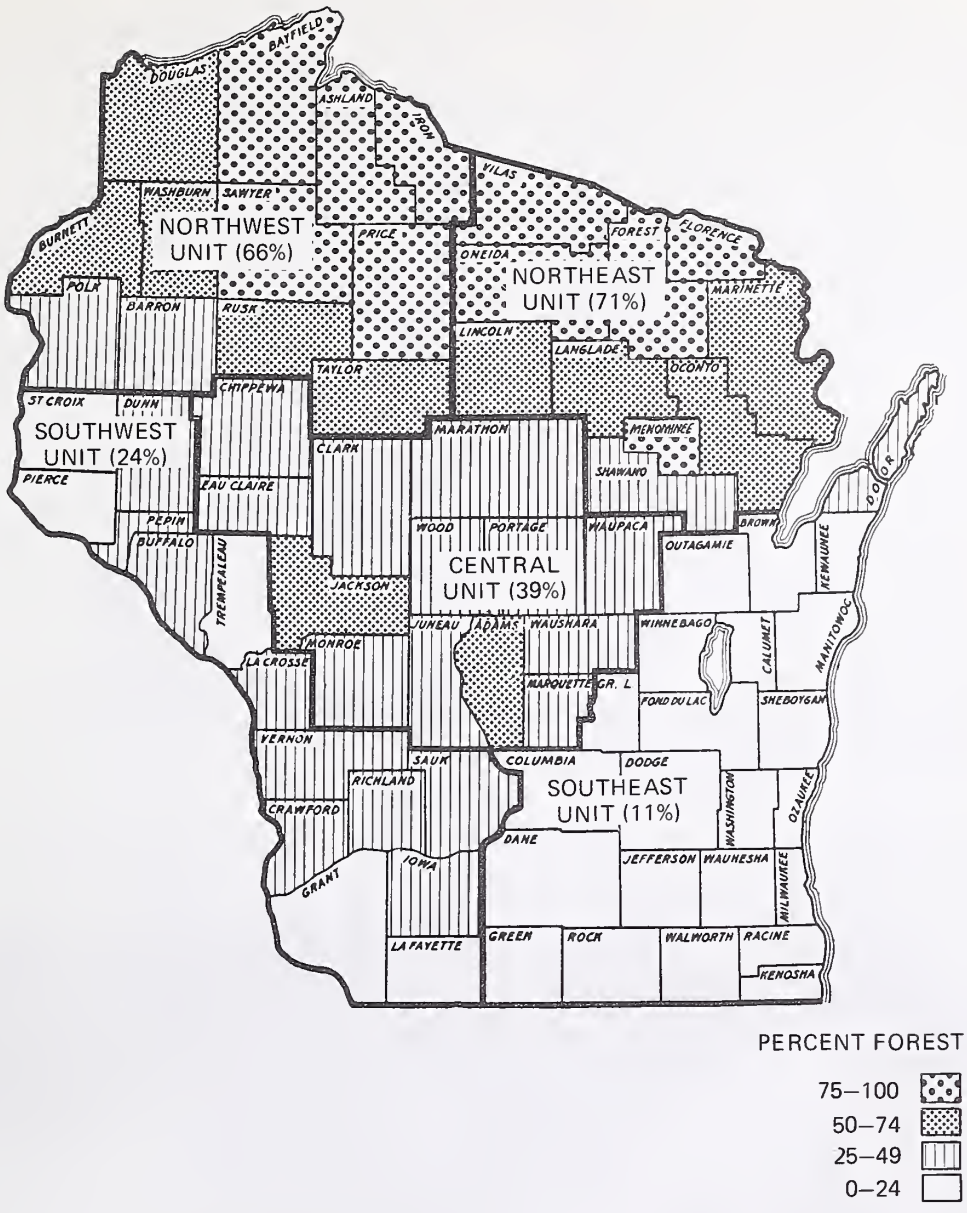

Figure 2. – Commercial forest area as a percent of all land area, by county, and by Forest Survey Unit, Wisconsin, 1968.

done in Wisconsin. From 1956 through 1968, more than half a million[2] acres were planted or seeded to forest trees, for an average of about 39,000 acres per year. The area planted has been in general decline since 1959, the peak year of the period, when 53,000 acres were artificially regenerated (fig. 3).

Much of the increase in area of the larger stand sizes is due to a general growth of trees into larger diameter classes and is dramatic evidence of the continuing improvement of the forests in Wisconsin and throughout the Lake States[3] from the cutover and/or burned over situation of the early 1900's. The remaining 4,489 thousand acres of sapling and seedling stands will con-

[2] *USDA Forest Service. Reports of forest and windbarrier planting and seeding. 1956-1968.*

[3] *Michigan, Wisconsin, and Minnesota.*

Table 1. – Commercial forest land area by stand-size class, Wisconsin, 1956 and 1968

Stand-size class	1956		1968	
	Thousand acres	Percent	Thousand acres	Percent
Sawtimber	2,054	14	3,098	21
Poletimber	4,822	32	6,580	45
Sapling and seedling	5,645	38	4,489	31
Nonstocked areas	2,347	16	370	3
All classes	14,868	100	14,537	100

Figure 3. – Planting red pine by machine. One probable reason for the decline in tree planting since 1959 is the huge success of past planting and the resultant shrinking area of nonstocked forest land.

tribute substantially to future ingrowth, the portion of annual net growth attributable to trees just entering poletimber size. This should help to maintain annual net growth at a high level at least through the 1970's. The number of growing-stock trees in the larger diameter classes increased between surveys (table 2). Concurrently, there was a decrease in the number of trees in smaller diameter classes.

Table 2. – Number of growing-stock trees on commercial forest land by diameter class, Wisconsin, 1956 and 1968

Diameter class	Number of growing-stock trees		Change
	1956[1/]	1968	
	Million trees	Million trees	Percent
2	3,571	2,887	(-)19
4	1,777	1,583	(-)11
6	764	916	20
8	327	437	34
10	147	196	33
12	62	85	37
14	32	43	31
16	17	23	37
18	8	12	46
20	4	6	48
22+	4	6	43
Total	6,714	6,192	

1/ Published 1956 numbers of trees data were adjusted to be comparable with 1968 data.

The change in area of stand-size classes between surveys in Michigan is strikingly similar to the change in Wisconsin (table 3).

Table 3. – Area change between surveys, by stand-size class, Wisconsin, 1956-68, and Michigan, 1955-66 (In percent)

Stand-size class	Wisconsin	Michigan
Sawtimber	+51	+57
Poletimber	+36	+34
Sapling and seedling	-20	-21
Nonstocked areas	-84	-83
All classes	- 2	- 1

The Northwestern Unit contains the largest areas of every stand-size class except sawtimber stands. The latter are most numerous in the Southwestern Unit, probably partly because the predominant oak stands found on the tops of bluffs and steep hills common to this part of the State are relatively inaccessible and were seldom logged. This portion of Wisconsin is in the so-called "driftless area" that was missed by the smoothing action of the last glaciers.

Aspen-Birch Most Extensive Forest Type

The aspen-birch and maple-beech-birch forest types, which occupy 29 percent and 24 percent, respectively, of the total commercial area, were the most extensive in the State in 1968. These two types covered the largest areas during the 1956 survey also. However, the proportions each represented of the commercial forest changed somewhat between surveys as the aspen-birch area dropped and area of maple-beech-birch gained (table 4).

The drop in area of aspen-birch type can best be explained by an understanding of some of the characteristics of quaking aspen, the predominant member of the type. Quaking aspen is very intolerant of shade and is generally short-lived, reaching rotation age[4] in about 55 years on good sites and about 30 years on poor sites.[5] After fires or other disturbances it produces many aggressive suckers that reestablish aspen as the dominant species on the site. In Wisconsin and throughout the Lake States, aspen-birch replaced much of the original forests following logging and fires. Today mature aspen and paper birch are commonly replaced by more shade-tolerant species such as sugar maple, balsam fir, and white spruce. The probable outlook is for a continued decline in the area of this forest type because of natural plant succession unless management practices designed to favor aspen-birch – already applied on some areas – are more widely undertaken. Clearcutting is one such practice (fig. 4). It achieves the same results as fire in this regard by removing overstory trees in a patch or block of forest, permitting full sunlight to reach the forest floor and stimulate the growth of aspen suckers.

It may seem incongruous that the area of the aspen-birch type declined between surveys, yet, as mentioned

[4] *Rotation age is the age at which a species matures and is harvested.*

[5] *USDA Forest Service, 1965. Silvics of forest trees of the United States Agric. Handb. 271, 72 p.*

Table 4. — Commercial forest area by forest type, Wisconsin, 1956 and 1968

Forest type	1956		1968	
	Thousand acres	Percent	Thousand acres	Percent
Aspen-birch	4,684	31	4,219	29
Maple-beech-birch	2,634	18	3,522	24
Oak-hickory	2,461	17	2,665	18
Elm-ash-cottonwood	840	6	1,158	8
Jack pine	687	5	727	5
Spruce-fir	352	2	628	4
Black spruce	207	1	236	2
Northern white-cedar	207	1	302	2
White pine	172	1	178	1
Red pine	146	1	310	2
Tamarack	131	1	222	2
Nonstocked	2,347	16	370	3
Total	14,868	100	14,537	100

Figure 4. — The photos above show the speed with which aspen regenerates naturally after clearcut logging. The photo at ~~left~~ right, taken in spring of 1971, shows an aspen-birch clearcut block in Vilas County following logging the previous summer. The photo at ~~right~~ left is the same area as it appeared in late summer of 1971. The lush carpet of aspen sprouts assures that aspen will remain the dominant species here in the future, and provides valuable food and cover for deer, grouse, and other wildlife. (Photos courtesy of Wisconsin Department of Natural Resources.)

later, the volume of both aspen and paper birch gained. The explanation lies in the fact that there were more larger trees in 1968 than in 1956. As shown earlier, the total area of sapling and seedling stands dropped between surveys, but the area of poletimber and sawtimber stands increased.

Some of the increase in area of the maple-beech-birch and spruce-fir types is probably at the expense of the aspen-birch type as discussed above. The doubling of the red pine type between surveys is almost certainly due to tree planting. Much of the more than 500,000 acres of forest tree planting in the State between 1956 and 1968 was planted to red pine.

Tree Stocking Is Good

Tree stocking, expressed as a percent of the minimum stocking required to make full use of the site, is a useful measure of how well trees are utilizing an area. In general the stocking of live (growing-stock, rough, and rotten trees) and growing-stock trees is good in Wisconsin. For example, in 1968, 52 percent of the commercial forest area was overstocked or fully stocked (100 percent stocking or more) with live trees. When only growing-stock trees are considered, the figure changes to 24 percent. Ninety percent of the State's commercial area is medium-stocked or better (60 percent or more stocked) with live trees and 65 percent of the area is similarly stocked with growing-stock trees. Only 1 percent of the commercial area is nonstocked with live trees and only 4 percent is nonstocked with growing-stock trees.

The high rate of stocking of rough and rotten trees indicated above by the fairly wide differences between percent of area stocked with live and with growing-stock trees suggests a need for accelerated harvesting of rough and rotten trees or greater timber stand improvement effort. Thirty-one percent of all live trees in the State are rough or rotten. By far, the bulk are rough trees – those that are not classed as growing stock because of limbiness, poor form, or noncommercial species (fig. 5).

More rough trees are being used for lumber production as sawmills are equipped with more efficient machinery capable of using smaller logs. Logging operations in Wisconsin, as elsewhere, are moving toward more complete utilization of the timber resource by harvesting saw logs, pulpwood, and chip wood in one operation in some instances. Rough and rotten trees have had and will continue to have value by providing shelter for birds and some other forms of wildlife and by relieving the monotony to the viewer of some even-aged homogeneous stands.

Figure 5. – A poorly formed rough tree marked for removal. In the past most rough trees had little or no commercial value, although they occupied growing space. However, the intensifying interest in chipping wood and in maximizing fiber yield from the forest may kindle a new interest in these trees among landowners and timber producers alike. (Photo courtesy of Wisconsin Department of Natural Resources.)

Following are the proportions of all live trees in Wisconsin by tree class:

	Percent of all live trees
Growing-stock trees (over 1-inch d.b.h.):	
Saplings	50
Poles and sawtimber trees:	
Desirable	1
Acceptable	18
Rough trees (over 1-inch d.b.h.)	29
Rotten trees (over 1-inch d.b.h.)	2
All live trees (over 1-inch d.b.h.)	100

Four-Fifths of Commercial Area on Average or Low Sites

An exact method of determining the potential productive capacity of forest land has yet to be devised. However, an approximation of the present productivity of the land is provided by site index[6] because the most productive land usually grows the tallest trees at an index age (50 years in this report). Even though there is wide fluctuation between species, forest land in the Midwest can generally be categorized as follows:

Site index class	*Description*
55 or less	Low site
56 to 70	Average site
More than 70	High site

Measurements of site index indicate that 76 percent of Wisconsin's commercial forest land is capable of growing trees 50 feet and taller at age 50, but only 19 percent is capable of growing trees 70 feet and taller at the same age. The proportion of area in each site index class for each of Wisconsin's four largest types is shown in table 5.

Table 5. – Area of commercial forest land by site index class for selected forest types, Wisconsin, 1968 (In percent)

Site index class	Aspen-birch	Maple-beech-birch	Oak-hickory	Elm-ash-cottonwood
90-100	1	--	1	1
80- 90	7	3	3	4
70- 80	24	16	10	9
60- 70	34	38	22	18
50- 60	24	33	33	32
40- 50	8	9	24	25
30- 40	2	1	7	10
20- 30	--	--	--	1
	100	100	100	100

Still another way of gaging the productive capacity of Wisconsin's forest land is to consider site class. This is a means of grouping forest lands in terms of their inherent capacity to grow crops of industrial wood. The following tabulation shows the percent of commercial forest land in Wisconsin and in neighboring Michigan in each site class, representing potential growth in cubic feet per acre per year providing all stands had an optimum distribution of age classes and were fully stocked and adequately protected.

	Percent of commercial forest area	
Site class	*Wisconsin*	*Michigan*
120 to 165 cubic feet	1	1
85 to 120 cubic feet	10	10
50 to 85 cubic feet	36	30
Less than 50 cubic feet	53	59
Total	100	100

The above proportions are not the best that can be expected in either State. Potential growth may be increased even further in the future by such stratagems as fertilization, genetic improvement of trees, type conversion, irrigation, and drainage control.

Half of State's Timber Younger Than 40 Years

Timber stands in Wisconsin are generally young. On 50 percent of the commercial area, stands are less than 40 years of age and 83 percent of the area supports stands less than 70 years old. Despite the youth of forests in the State – common throughout the Lake States – most forest types include some stands that are over rotation age and, therefore, are considered overmature. Also, the distribution of age classes for all forest types is not balanced. This is not particularly significant for those large areas in the State where uneven-aged management, a system that results in trees of many ages being present in the stand. is practiced or contemplated. Stand-age distribution is important in planning the harvest sequence of stands managed under even-aged systems. Although there are a number of forest types in Wisconsin that may be managed in this manner, most notably aspen-birch, individual stand conditions and owner preferences and goals will determine the management prescription.

A model even-aged forest situation for maximum timber production would have an equal area in each 10-year-age class for each forest type and no overmature timber. While these ideal conditions rarely occur anywhere except under intensive management, they are a goal towards which present management can aim in those stands for which even-aged management is prescribed.

The largest area in three of the four major forest types is in the 40- to 59-year age class (fig. 6).

[6] *Site index is the height in feet of average dominant or codominant trees at 50 years of age. For example, "site index 60" for red pine means that the height of dominant or codominant trees in that area averages 60 feet at 50 years of age.*

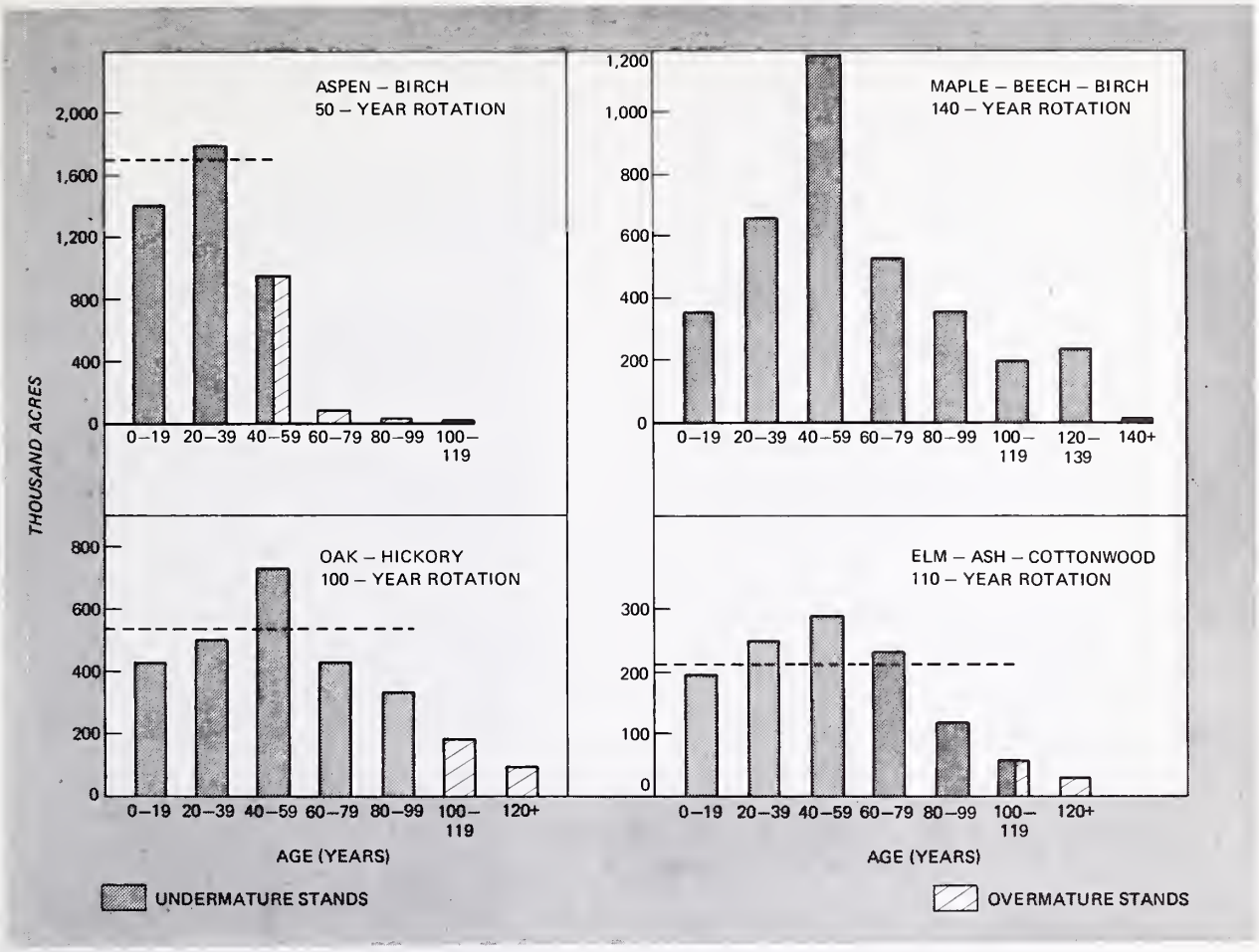

Figure 6. – Area of some forest types by stand-age class and desirable area based on rotations suggested for average sites in Wisconsin, 1968. Broken lines show desirable level for rotation shown. (No desirable level shown for the maple-beech-birch type because this type is usually managed under all-aged conditions.)

The predominance of stands originating around 1920 is probably largely due to the decline of logging in the State after its peak about 1899 and subsequent natural regeneration, much of which followed the burning of cutover areas. Fire played a big role in the genesis and character of stands then because little was done to control it. Although minimal public forest fire control efforts were undertaken as early as 1895, it was not until the early 1930's that the program was funded and staffed sufficiently to reduce significantly the annual burned acreage.

Small areas of overmature stands occur in all but the maple-beech-birch type. Mortality in the three affected types will be reduced as these overmature stands diminish.

Volume of Growing Stock Up 30 Percent

Wisconsin's 1968 volume of growing stock on commercial forest land amounted to 11.0 billion cubic feet, a 30 percent gain from the 8.4 billion cubic feet in 1956.[7] This large increase came about in spite of a 2.2 percent loss of commercial forest area between surveys. Such a seemingly implausible situation can exist in young forests such as those in Wisconsin where the area of pole-timber and sawtimber stands, with attendant high volumes per acre, is increasing, and the area of sapling and seedling stands and nonstocked areas, with low volumes

[7] *Published 1956 volumes have been adjusted to be comparable with 1968 volumes.*

per acre, is declining. The following tabulation compares growing-stock volumes for 1956 and 1968:

	1956	*1968*
	(Million cubic feet)	
Softwoods	1,670	2,475
Hardwoods	6,768	8,521
Total	8,438	10,996

Volume in the Northwestern Forest Survey Unit increased more between surveys than any other unit. This explains why the Northwestern Unit contained the largest growing-stock volume in 1968 – 35 percent of the State total – but ranked second in 1956 to the Northeastern Unit. The Northeastern Unit was a close second in 1968 with 32 percent of the State's volume. Volumes in every unit increased except for softwoods in the Southwestern Unit (table 6).

Table 6. – Growing-stock volume in 1968 and change since 1956, Wisconsin

Survey unit	Softwoods		Hardwoods	
	1968 volume	Change	1968 volume	Change
	Million cu. ft.	Percent	Million cu. ft.	Percent
Northeastern	1,148.2	+36	2,384.6	+31
Northwestern	911.1	+73	2,987.0	+42
Central	320.8	+56	1,321.5	+18
Southwestern	21.5	-19	1,218.6	+ 2
Southeastern	73.1	+ 9	609.7	+13
Total	2,474.7	+48	8,521.4	+26

The average volume per acre of growing stock rose from 567 cubic feet (7.2 cords) in 1956 to 756 cubic feet (9.6 cords) in 1968. The largest average volume per acre in 1968 was in the Northeastern Unit (870 cubic feet).

Hardwoods accounted for three-fourths of the growing-stock volume in 1968. However, the volume of softwoods increased much faster between surveys than did the hardwood volume, resulting in a gain in the proportion of volume in softwoods from 20 percent of the total in 1956 to 23 percent in 1968.

Five species made up half the total hardwood volume in 1968: aspen,[8] with twice as much volume as any other species, had 20 percent of the total followed by northern red oak (9 percent), sugar maple (9 percent), paper birch (7 percent), and elm (6 percent). Almost all species increased between surveys (fig. 7). The major exception was white oak which declined slightly. Surprisingly, the volume of elm gained in spite of the spread of Dutch elm disease into all but the northwest corner of the State by 1968. The probable outlook for elm is increasing heavy mortality as a direct result of the Dutch elm disease, causing inventories to dip. This was the case in lower Michigan where the disease was reported earlier than in Wisconsin.

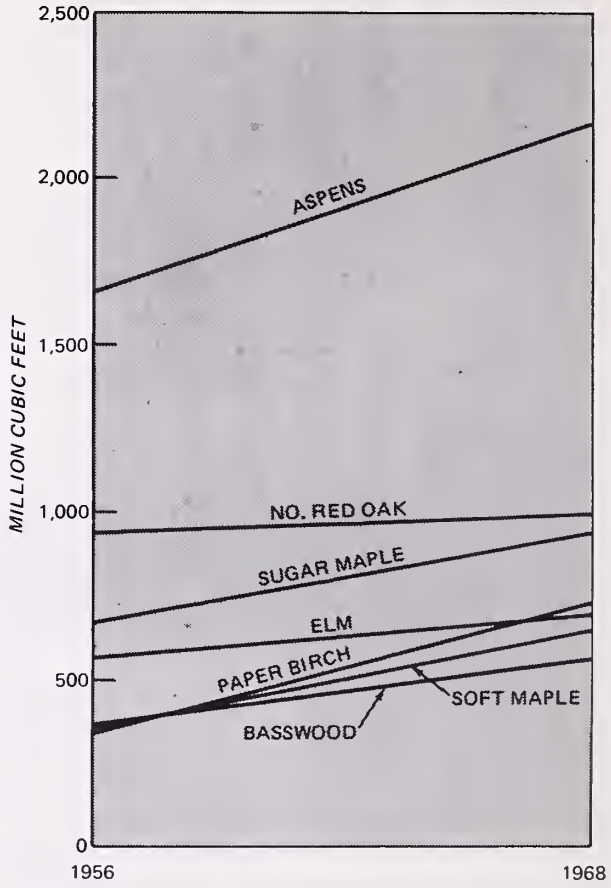

Figure 7. – Change in growing-stock volume between surveys for some major species in Wisconsin.

In general, the bulk of the softwood growing-stock volume is found in the two northern units. These units also contain the greatest volumes of hardwoods, but the two southern units have the highest proportion of hardwood volume to softwood volume: 98 percent of the volume in the Southwestern Unit is in hardwood species as is 89 percent of the Southeastern Unit volume.

Forty-five percent of the State's important aspen growing-stock volume is in the Northwestern Unit. The Northeastern Unit contains another 32 percent of it.

[8] *Includes both quaking and bigtooth aspen.*

Growing-stock volumes gained in every diameter class, with gains especially large in the smaller diameters (fig. 8). This situation is common in the Lake States where forests are generally young and rebuilding.

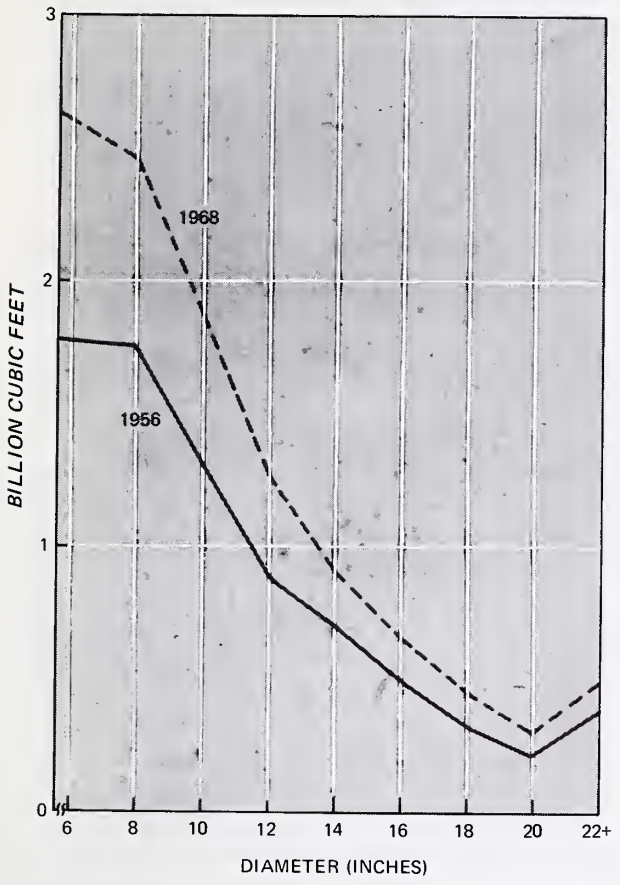

Figure 8. – Distribution of growing-stock volume by diameter class, Wisconsin, 1956 and 1968.

Farmers, private individuals, and corporations other than forest industries own 60 percent of the growing-stock volume in the State. Public agencies other than the USDA Forest Service own another 20 percent of the volume. Volume per acre is highest on forest industry-owned commercial forest land – 918 cubic feet, compared with the State average of 756 cubic feet.

Nongrowing-Stock Volume Amounts to 1.1 Billion Cubic Feet

Besides the 11.0 billion cubic feet in growing-stock trees, there is another 1.1 billion cubic feet in nongrowing-stock trees in the State. Most of the latter volume is in rough or rotten trees, but a small amount is in salvable dead trees. Short-log trees are rough trees and account for 34 percent of the nongrowing-stock volume. These trees must be sawtimber-sized and have at least one merchantable 8- to 11-foot saw log, but do not contain a 12-foot saw log. Short-log trees are utilized for pulpwood and saw logs by industry. Little of the remaining nongrowing-stock volume is harvested, although some of it is used for fuelwood, fenceposts, pulpwood, and veneer bolts. Volume in nongrowing-stock trees is distributed as follows:

Class of timber	*Volume (Million cubic feet)*
Rough trees:	
Short-log trees	383.9
Other rough trees	439.1
Rotten trees	260.8
Salvable dead trees	53.6
Total	1,137.4

Sawtimber Volume Increased 37 Percent

The sawtimber portion[9] of the growing-stock volume also increased between surveys and at a faster rate than total growing-stock volume. Sawtimber volume rose from 15.8 billion board feet[10] in 1956 to 21.8 billion board feet in 1968, a gain of 37 percent compared with the 30 percent rise in growing-stock volume. The softwood and hardwood sawtimber distribution of the two surveys is shown below:

	1956	*1968*
	(Million board feet)	
Softwoods	4,783	6,497
Hardwoods	11,049	15,259
Total	15,832	21,756

One-third of the State's 1968 sawtimber volume is found in the Northeastern Unit – more than in any other unit. As mentioned earlier, the largest growing-stock volume is in the Northwestern Unit. In 1956 the Northeastern Unit also led in volume of sawtimber, but between surveys, volume increased faster in the Northwestern Unit (table 7).

[9] *Sawtimber trees are growing-stock trees that contain at least one 12-foot saw log or two noncontiguous saw logs, each 8 feet or longer and are at least 9.0 inches d.b.h. for softwoods and at least 11.0 inches d.b.h. for hardwoods.*

[10] *International 1/4-inch log rule.*

Table 7. – Sawtimber volume in 1968 and change since 1956, Wisconsin

Survey unit	Softwoods		Hardwoods	
	1968 volume	Change	1968 volume	Change
	Million bd. ft.	Percent	Million bd. ft.	Percent
Northeastern	3,354.9	+28	3,946.8	+52
Northwestern	2,157.4	+59	3,865.7	+77
Central	810.8	+54	2,438.3	+19
Southwestern	41.9	-62	3,378.8	+16
Southeastern	132.1	-17	1,629.0	+25
Total	6,497.1	+36	15,258.6	+38

The average sawtimber volume per acre in 1956 was 1,065 board feet, but in 1968 it had risen to 1,496 board feet. Highest volumes per acre are found in the south – 2,291 board feet in the Southwestern Unit and 1,949 board feet in the Southeastern Unit.

Hardwoods dominate the sawtimber volume as they do growing-stock volume. Several of the species that contain the largest growing-stock volumes also contain the largest sawtimber volumes. However, the ranking of species differs, and two softwood species are among the top six in terms of proportion of sawtimber volume: northern red oak (13 percent of total sawtimber volume), sugar maple (10 percent), aspen (10 percent), white pine (9 percent), elm (9 percent), and hemlock (7 percent).

The largest volume by far of northern red oak, and other oaks as well, is in the Southwestern Unit. The biggest concentration of sugar maple sawtimber volume is in the Northeastern Unit.

The pattern of ownership of the sawtimber inventory is similar to that of the growing-stock volume – farmers, private individuals, and corporations other than forest industries own 63 percent of it. Public agencies own a slightly smaller percentage of the sawtimber inventory than of the growing-stock inventory.

Quality of Butt Logs Better For Hardwoods than For Softwoods

An estimate of the quality of the sawtimber trees in Wisconsin's forests was made by grading the butt log in about one-third of the sawtimber trees sampled during the 1967 survey (table 8). (Log grade standards used for each species are indicated in the Appendix.)

The means are not available to convert the above percentages in Wisconsin to an expression of whole-tree quality. The recent Michigan survey provided data that did permit such a conversion for hardwoods in that State. The result in Michigan showed that the percentage of hardwood-tree volume in each log grade was practically the same as the percentage of butt logs in each grade.

Table 8. – Percent of sawtimber trees by butt log grade and softwoods and hardwoods, Wisconsin, 1968

Butt log grade	Softwoods	Hardwoods
Grade 1	2	10
Grade 2	8	32
Grade 3	85	53
Grade 4	5	5
Total	100	100

The percentage of sawtimber trees with a Grade 1 butt log in Wisconsin was highest for cottonwood, for which there is presently low demand, and northern red oak, presently in high demand. Other species with high percentages of Grade 1 butt logs were ash, basswood, and elm. The primary reason all of the above species have high percentages of Grade 1 butt logs is their big percentage of trees in the upper diameter classes where better quality butt logs are possible.

Volume of Net Growth Rises

Net annual growth on growing-stock trees was 500 million cubic feet in 1967, a 30 percent increase over the 391 million cubic feet in 1955. The 1967 growth rate was 4.5 percent of inventory compared with 4.6 percent in 1955. Growth in 1967 averaged 34 cubic feet per acre in comparison with 26 cubic feet per acre in 1955. Although this represents a substantial gain between surveys and is further evidence of the improving condition of the State's forests, it is still much below the estimated average annual capacity of the commercial forest to produce 49 cubic feet of wood per acre. As mentioned earlier, this potential growth presupposes ideal conditions – fully stocked stands and optimum distribution of age classes. Therefore, potential yield serves as a goal as forest managers try to better the conditions for growth.

One-fourth of the total net growth in 1967 was ingrowth – the net volume of small trees that grew to poletimber size during the year. The other three-fourths of the total was growth on trees already 5 inches d.b.h. and larger (fig. 9). The 4.5 million acres of sapling-seedling stands in 1968 represent a potentially large

Figure 9. – A field man measures the diameter at breast height (d.b.h.) of a sawtimber-sized tree while his companion records information on plot sheet. Such measurements made on the same trees during the 1956 and 1968 surveys on permanent sample plots provided a value of radial growth accrued between surveys. This information was used to estimate the total volume of growth in the State. (Photo courtesy of Wisconsin Department of Natural Resources.)

volume of ingrowth for the next 10 to 15 years. However, as the area of this stand-size class diminishes, as it has done between surveys, the volume of ingrowth will also diminish. This means that the present volume of growing-stock growth cannot be maintained for much longer if the intensity of management is not increased. The 30-year projections of inventory, growth, and removals that follow later in the report assume no change in the intensity of forest management and indicate a leveling off or turndown of growth volume toward the end of the period.

The percentage of total growth represented by ingrowth was somewhat larger in Wisconsin than in Michigan (table 9).

Sawtimber net annual growth increased between surveys from 912 million board feet in 1955 to 1,264 million board feet in 1967, a gain of 39 percent. Sawtimber

Table 9. – Volume of net annual growth by components of growth, Wisconsin, 1967, and Michigan, 1965

Component of growth	Net annual growth on growing stock			
	Wisconsin		Michigan	
	Thousand cu. ft.	Percent	Thousand cu. ft.	Percent
Ingrowth	133,249	27	133,386	23
Growth on growing stock	366,864	73	446,171	77
Total net growth	500,113	100	579,557	100

growth rates remained unchanged between surveys – 5.8 percent of sawtimber inventory.

Mortality of growing-stock trees amounted to 60 million cubic feet in 1967, 0.5 percent of inventory. This is not a high mortality rate when compared with Michigan's 1965 rate of 1.6 percent. One reason for Wisconsin's lower mortality rate is its higher rate of timber removals than Michigan's. Wisconsin's 1967 removals rate was 2.1 percent of growing-stock inventory, but Michigan's 1965 rate was only 1.4 percent. Therefore, more dying trees probably were removed before they died in Wisconsin than in Michigan. Mortality amounted to 11 percent of the volume of growing-stock gross growth in 1967:

	1967 (Thousand cu. ft.)
Gross growth	560,026
Mortality	59,913
Net growth	500,113

One-fourth of the total volume of mortality of growing-stock trees in 1967 was attributable to quaking aspen alone, and half the total mortality volume was made up of three species – quaking aspen, elm, and northern red oak.

Diseases were the cause of half the volume of mortality. Weather, logging, insects, suppression by trees or other vegetation, and animals were other important causes of the death of trees. Hypoxylon canker of aspen and Dutch elm disease are two of the most serious diseases. In 1968 Dutch elm disease had spread to 56 of Wisconsin's 72 counties.

Mortality of sawtimber trees in 1967 was 8 percent of sawtimber gross growth:

	1967 (Thousand bd. ft.)
Gross growth	1,375,071
Mortality	111,406
Net growth	1,263,665

Elm sustained the largest volume of sawtimber mortality – one-fifth of the State total. Three species account for nearly half the total mortality – elm, northern red oak, and hemlock.

Timber Removals About Half of Growth

Timber removals of growing stock (fig. 10) in 1967 were an estimated 233 million cubic feet compared with the 500 million cubic feet of net annual growth mentioned earlier. Timber removals include not only trees harvested, but trees cut or destroyed by thinnings, land clearing, or changes in land use. Sawtimber removals in 1967 were estimated to be 650 million board feet in comparison with 1,264 million board feet of net growth. Net growth of both growing stock and sawtimber in 1955 was also higher than removals. This continuing trend of growth over removals has, of course, caused inventories to build up between surveys.

Aspen growing-stock removals in 1967 amounted to 88 million cubic feet or 38 percent of the total, by far the largest proportion of any species. The red oaks were a distant second with 34 million cubic feet, followed by hard maple with 18 million cubic feet.

Two-thirds of the total removals came from the two northern survey units.

Sawtimber removals were generally similar to growing-stock removals in percentage by species and by survey unit.

Figure 10. – A mechanical feller-buncher harvesting trees in an aspen-birch stand. Aspen growing-stock removals accounted for 38 percent of the State total in 1967, which easily made it the leader among species. (Photo courtesy of Wisconsin Department of Natural Resources.)

Despite a generally rising total production from them, there were only 898 primary wood-using plants operating in 1967 in Wisconsin, compared with 1,753 in 1956. Only medium-sized[11] sawmills increased in number between surveys.

Wisconsin Topped Nation in Paper Production in 1967

That the pulp and paper industry in Wisconsin is highly important both to the Nation and to the State is attested to by the fact that in 1967 Wisconsin ranked second among all States in production of paper and board products (2.8 million tons).[12] Even more impressive was the State's production of paper in 1967 of 2.3 million tons which ranked first in the Nation and accounted for 11 percent of the country's total production. In 1958 Wisconsin ranked first in production of paper and board products with 2.1 million tons.

However, Wisconsin ranked only tenth among States in production of woodpulp in 1967. No exact figures are available on woodpulp imports[13] but when the 1967 woodpulp production of 1.4 million tons is compared with woodpulp consumption of 2.1 million tons, it is clear that a large amount is imported. Nearly half of the wood to operate Wisconsin's pulpmills is also imported (fig. 11). In 1967, of the 215.6 million cubic feet of pulpwood[14] received at pulpmills in the State, 106.0 million cubic feet were imported. Most of the imports came from neighboring Michigan and Minnesota, but about 30 million cubic feet came from western States and Canada.

The number of pulpmills declined slightly between surveys, from 29 in 1956 to 27 in 1967. Nine mills were located in the Central Unit, eight mills were found in southeastern Wisconsin, and seven in the Northeastern Unit. No pulpmills were located in southwestern Wisconsin, and only three were situated in the northwestern group of counties. Pulpmill capacity climbed from 3,900 tons per day in 1956 to 4,620[15] tons per day in 1967.

Sawmill Numbers Drop

Sawmills accounted for 91 percent (818) of the total number of primary wood-using plants in 1967. In 1956 sawmills made up 93 percent of the number of plants and were nearly twice as numerous (1,628). Most of the sawmills in both years were small – producing less than 1 million board feet of lumber annually. Only six sawmills in the State produced 5 million board feet or more of lumber annually in 1967, compared with eight mills in 1956. Five of the six large mills were located in northeastern Wisconsin. The total number of sawmills was divided rather evenly between Forest Survey Units, but a few more mills were located in southwestern and central Wisconsin.

Lumber production in the State amounted to 286 million board feet in 1967 and has remained generally constant since the last survey (fig. 12). The sawmill boom days peaked around 1899 when 3.4 billion board feet of lumber – the largest recorded volume in the State's history – was produced. From then until a Depression-time low of 120 million board feet, the trend of lumber production was one of sharp decline as the State's supply of old growth timber ebbed. Since 1932 there have been fluctuations in output of lumber, but the volume produced has not reached 500 million board feet.[16]

In 1967 more lumber (26 percent of the total volume) was sawn from red oaks[17] than from any other species. Sugar maple (16 percent), aspen (12 percent), and elm (11 percent) followed. All softwoods together amounted to only 10 percent of the lumber sawn.

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[11] *Sawmills with an annual lumber output of from 1 million to 4.999 million board feet.*

[12] *U.S. Bureau of the Census. Current Industrial Reports Series.*

[13] *Material brought into the State from any origin, chiefly from neighboring States.*

[14] *Includes round pulpwood and mill residues (mostly chips from sawmill slabs and edgings and from veneer cores).*

[15] *The capacity of one paper products company is not available and is excluded from the 4,620 tons per day capacity shown.*

[16] *No data is available on lumber production volumes from 1948-1953.*

[17] *Red oaks include all species listed under the select red oak and other red oak groups of the Principal Tree Species in Wisconsin section of the Appendix.*

Figure 11. – Pulpwood moving into the debarker at the American Can Company pulpmill at Wausau. It is natural that almost half the pulpwood received at Wisconsin pulpmills is from out of State because eastern Minnesota and upper Michigan are part of the timbershed for the State's pulp and paper industry. Markets for such material do not stop at State boundaries but extend to their economic limits.

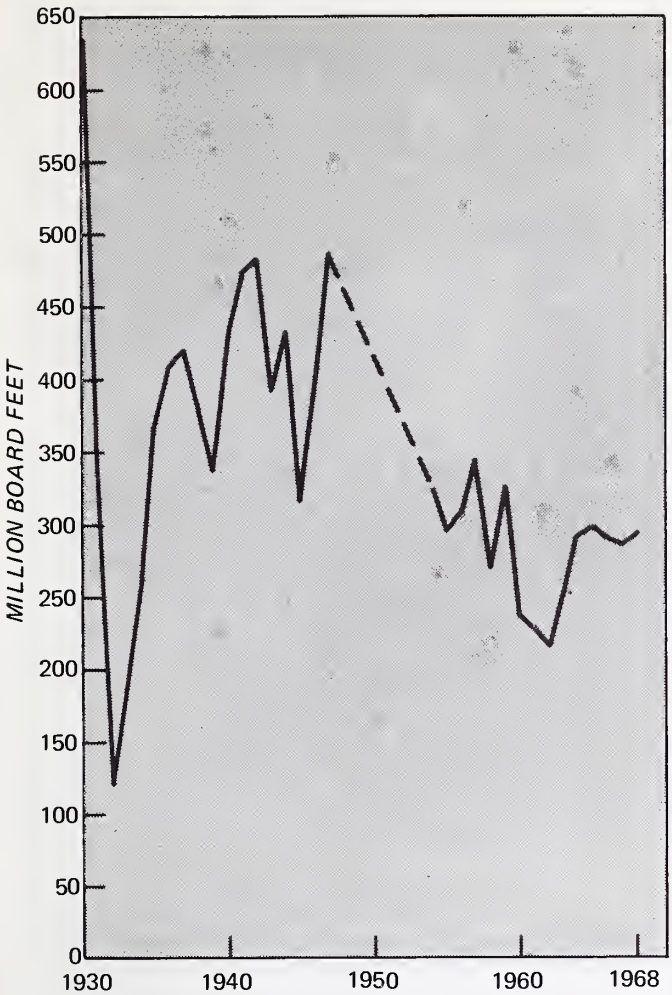

Figure 12. — Volume (lumber tally) of lumber produced in Wisconsin, 1930-1968. Figures are not available from 1948 to 1953.

The Northeastern Unit, led by Shawano County, produced more lumber in 1967 than any of the other units in the State (104 million board feet).

More Than Half of State's Veneer Mill Log Supply Comes from Neighboring Areas

The number of veneer mills fell from 47 in 1956 to 26 in 1967. Container veneer mill numbers declined the most, from 26 to 10. The capture of part of the veneer market for fruit and vegetable produce containers by paper and plastic materials is a major reason for this decline. Veneer mills are located primarily in eastern Wisconsin and in the Northwestern Unit.

The State's veneer mills used three-fourths of the veneer logs received at mills in the Lake States in 1967. Of the 42.2 million board feet of veneer logs processed in Wisconsin, only 20.5 million board feet were produced in the State. Michigan, Canada, and Minnesota provided most of the rest. A number of mills produce high-quality face and specialty veneers requiring fine hardwoods. Many of the logs required are brought into the State. For example, more yellow birch was consumed by Wisconsin veneer mills in 1967 than any other species (9.6 million board feet), but only about one-fifth of it (1.8 million board feet) was produced in the State. Canada shipped 4.2 million board feet of yellow birch veneer logs to Wisconsin. Slightly more than two-fifths of the 9.0 million board feet of hard maple veneer logs consumed came from Wisconsin. The rest were largely from Michigan.

Veneer log exports from Wisconsin amounted to 2.5 million board feet of a wide mixture of species. Significant is the 0.7 million board feet of black walnut that was shipped to Indiana and Iowa veneer mills. Only 33 thousand board feet of this highly prized wood that was produced in Wisconsin was used in the State's veneer mills.

The number of other primary mills declined between surveys at about the same rate as the above mills. Cooperage mills dipped from 5 to 3; charcoal plants from 4 to 2; and miscellaneous plants, including lath, particleboard, shaving, excelsior, fence, and specialty plants, fell from 40 to 22.

Impact of Forest Industries on the State's Economy Is Great

Wisconsin's wood-using industries are important contributors to the State's economy. All lumber and wood products manufacturing plants[18] and all paper and allied products plants[19] together accounted for 11 percent of the number of all employees and payrolls of manufacturing firms in the State in 1967.[20]

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[18] *U.S. Bureau of the Census. Standard Industrial Code 24. Includes logging camps and logging contractors, sawmills and planing mills, millwork, plywood and related products mills, wooden container mills, and miscellaneous wood products.*

[19] *U.S. Bureau of the Census. Standard Industrial Code 26. Includes pulpmills, paper mills (except building paper), paperboard plants, miscellaneous converted paper products mills, and plants producing paperboard containers and boxes.*

[20] *1967 Census of Manufactures.*

Considering only primary wood-using industries, a total of 1.3 million man-weeks[21] of work were provided in 1967 – 1.0 million man-weeks by pulp and paper mills alone. Three-fourths of the total employment is located in two units, the Central and Southeastern.

The value of logs and bolts (f.o.b. mill) harvested in Wisconsin in 1967 amounted to 39.7 million dollars. Pulpwood accounted for slightly better than half of the total value and lumber logs and bolts for about one-third. The value of roundwood harvested was highest in the Northeastern Unit (about 40 percent of the total) because timber removals for products were highest there also.

According to Bureau of the Census data,[22] logging camps and logging contractors paid 5.0 million dollars in payrolls in 1967, sawmills and planing mills paid 9.0 million, veneer and plywood plants paid 10.1 million, and paper and allied products[23] paid 300.3 million.

Value added by manufacture – the difference between the cost of goods purchased by an enterprise and the sales value of its product – is an economic indicator of the dollar-generating capacity of an industry. Logging camps and logging contractors added 9.9 million dollars in 1967, compared with 6.2 million in 1963, according to Bureau of the Census. Sawmills and planing mills added 17.0 million in 1967 compared with 15.7 million in 1963; veneer and plywood mills added 16.8 million in 1967 compared with 17.0 million in 1963. Value added by paper and allied products mills was 663.5 million in 1967 and 501.8 million in 1963.

Pulpwood Accounts for Biggest Share of Timber Products Output

Total timber products output[24] in 1967 was 199.9 million cubic feet, down about 20 percent from the 246.6 million cubic feet in 1956. Significant changes from 1956 were a 52 percent increase in output of pulpwood between surveys and a 70 percent decrease in fuelwood output.

Pulpwood accounted for 56 percent of the total timber products output. The 112 million cubic feet of pulpwood output in 1967 was 52 percent greater than the 74 million cubic feet output in 1956. Ninety percent of the 1967 pulpwood output came from growing-stock trees and 80 percent of the total was from hardwood trees, mostly aspen. The two northern units provided the bulk of the pulpwood output (83 percent).

Saw log and bolt output in 1967 made up 23 percent of the total timber products output. The 1967 volume of 45 million cubic feet was down significantly from the 55 million cubic feet in 1956. Hardwoods dominated with 90 percent of the saw log output. Select red oaks, hard maple, elm, aspen, and basswood were the leading saw log species. Even though total saw log output declined between surveys, the outputs of the Central and Southeastern Units increased somewhat.

The output of most other timber products dropped since the last survey. Some products, such as fuelwood and posts, fell to only a fraction of their 1956 volume, but a few, such as poles and pilings, gained a little.

The output of major roundwood products (total timber products output less plant residues) generally declined from 1946 to 1967 (fig. 13).

Total receipts of roundwood timber products at Wisconsin primary wood-using plants in 1967 (255 million cubic feet) remained nearly the same as in 1956 (254 million cubic feet). Receipts were greater than output in both survey years, but the difference was greatest in 1967 when the output was 156.7 million cubic feet. Wisconsin, then, is a net importer of roundwood. Pulpwood accounted for the largest share of imports in 1967. The State's pulpwood output of 103 million cubic feet was not sufficient alone to meet the 195 million cubic feet received at pulpmills.

Even though total receipts at primary plants remained static between surveys, the receipts of specific timber products varied considerably. Pulpwood gained but all other products[25] dropped. Veneer log receipts in 1967 fell to almost half the amount in 1956.

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[21] *Refers to all employees (not just production workers). A man-week is 40 hours of work by one person.*

[22] *1967 Census of Manufactures.*

[23] *Includes primary and secondary mills.*

[24] *Includes output from both roundwood and plant residues.*

[25] *Receipts of poles, piling, posts, and fuelwood are unknown and excluded from "all other products."*

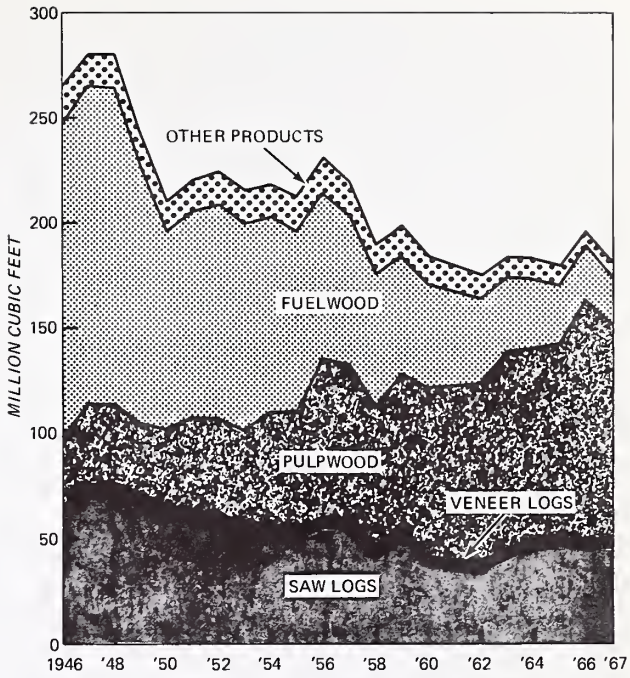

Figure 13. – Output of roundwood products in Wisconsin, 1946 to 1967. Points for some years are based on trend-level curves because survey data are not available for every year.

A LOOK INTO THE FUTURE

Recent Forest Service projections suggest that by the year 2000 the Nation's demand for industrial wood products (all roundwood products except fuelwood) from domestic forests may increase about 2.3 times present demand if the relative prices for wood products can be maintained.[26] The increase will not be the same for all timber products. For example, demand is projected to roughly double for saw logs and to nearly triple for veneer logs and pulpwood.

These prospective rising national demands will come during a period of generally shrinking commercial forest area, and possible important constraints on timber production brought on as a response to the mounting need to improve the environment and to promote multiple use of forest land.

The future of Wisconsin's timber resource undoubtedly will be shaped by the above as well as other pressures. Important questions are what the future timber supply in the State will be, and how it will relate to the needs of the Nation. As pointed out earlier, the growing-stock inventory increased 30 percent between 1956 and 1968. Three quarters of the volume is in hardwood trees – one-fifth of it in aspen trees alone. Also, growing-stock removals in 1967 were 47 percent of annual net growth.

One look at the State's possible forest situation 30 years hence is provided by computer-generated projections. Two such projections are presented; one assumes a high level of future timber removals and the other assumes a low level. Other assumptions common to both projections are: (1) the total area of commercial forest land will continue to decline modestly at an estimated rate of 0.141 percent per year; (2) radial growth as estimated from measurement of permanent plots during the last two surveys will decline over time in relation to the increase of basal area per acre of trees; (3) the intensity of forest management practiced will continue at the rate indicated by recent trends; and (4) that use of both hardwoods and softwoods for pulpwood will increase, but use of hardwoods will increase at a slower rate for most of the projection period.

[26] *Hair, Dwight, and H. O. Fleischer. Meeting growing demands for wood products. In [1971] Yearbook of Agriculture. U.S. Dep. Agric., p. 330-334. 1971.*

High Removals Option Projection

This projection is based on the assumption that timber removals for products will increase during the 30-year period, but at a decreasing rate each 10-year period. The initial removals rate for this option was higher than that for the low option, and the volume of removals is projected to be greater in every year than for the low option.

In general this projection shows increasing inventories of both growing stock and sawtimber (fig. 14), but the rate of increase drops off toward the end of the period – much more sharply for growing stock than for sawtimber. Growth and removals of growing stock almost meet in 1998 and for sawtimber they start to converge toward the end of the period.

Specifically, growth of growing stock, which amounted to 500 million cubic feet in 1968, is projected to peak about 1988 with 538 million cubic feet and to decline during the following decade to 528 million. At the same time timber removals, which were 233 million cubic feet in 1968, are projected to climb to 507 million in 1998. If the growth and removals curves were extended beyond 1998, they would cross at about the year 2000. The 1968 inventory of 11.0 billion cubic feet is projected to increase to 15.3 billion by 1988 and then to grow to only 16.0 billion in 1998 when the inventory curve almost flattens out. Should growth and removals become equal and remain so, the inventory curve would be a horizontal line.

Taken separately, the projections for softwoods and hardwoods show substantial differences. Softwood removals of growing stock are projected to jump from 30 million cubic feet in 1968 to 140 million in 1998, a 366 percent gain. Hardwood growing-stock removals, on the other hand, are projected to increase from 203 million cubic feet in 1968 to 367 million in 1998, only an 81 percent gain. Softwoods, which accounted for 13 percent of total removals in 1968, would make up 28 percent in 1998 under this projection. This reflects the assumed future faster rate of increase of softwood removals mentioned earlier.

Softwood growing-stock growth is projected to gain 15 percent between 1968 and 1998, compared with only 2 percent for hardwoods. Likewise softwood inventory would gain 73 percent during the same period, from 2.5 to 4.3 billion cubic feet, but hardwood inventory would increase only 38 percent, from 8.5 to 11.7 billion cubic feet.

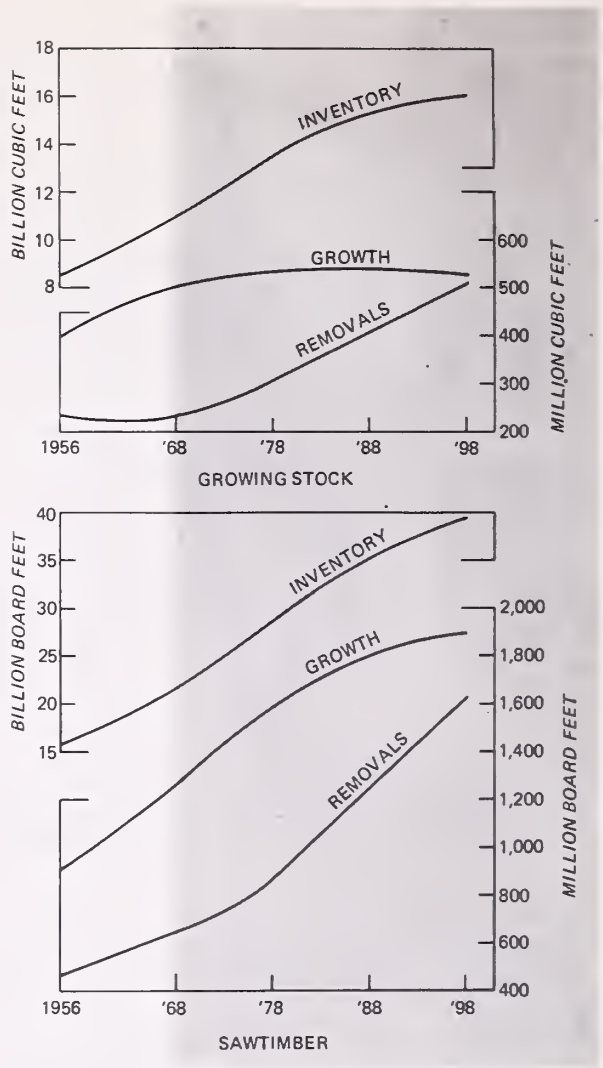

Figure 14. – Removals, net growth, and inventory of growing stock and sawtimber in Wisconsin, 1956 and 1968, and high removals option *projections for 1978-1998.*

Sawtimber projections of softwoods and hardwoods are similar to those above for growing stock. The major difference is that sawtimber growth for both species groups would increase substantially beyond that for growing stock. Softwood sawtimber growth is projected to rise 67 percent during the 30-year period compared with 15 percent for growing stock, and hardwood sawtimber growth would increase 44 percent compared with 2 percent for growing stock.

Low Removals Option Projection

As the name implies, this projection assumes a level of removals lower than the preceding projection. The assumption is also made that use of both softwoods and hardwoods for products will increase at an increasing rate each 10-year period. In general, the volume of removals is projected to be lower in every year of the period than for the high option, and growth and inventory volumes are projected higher.

This projection shows increasing inventories of both growing stock and sawtimber over the next 30 years with the rate of increase dropping off slightly toward the end of the period (fig. 15).

Growing-stock growth is projected to rise from 500 million cubic feet in 1968 to 552 million cubic feet in 1988, then drop to 545 million cubic feet in 1998. In spite of this tapering off of net growth, it would still be substantially above removals in 1998, although the growth and removals curves would intersect before another decade if they were extended. Timber removals of growing stock are projected to nearly double during the period, increasing from 233 million cubic feet in 1968 to 426 million cubic feet in 1998.

Growing-stock inventory would enlarge from 11.0 billion cubic feet in 1968 to 17.8 billion cubic feet in 1998 under the above conditions of growth excess. As the growth and removals curves approach each other toward the end of the projection period, the inventory curve begins to flatten out.

If softwoods and hardwoods are considered separately, the shape of the curves for each would be very similar to those shown in figure 15. There are, however, important differences in the projections for these two species groups. The average rate of increase of softwood growing-stock inventory would be almost twice that of hardwoods during the 30-year projection period – 3.2 percent per year for softwoods compared with 1.7 percent per year for hardwoods. The disparity is even wider for net annual growth volume, where the average annual increase for softwoods is projected to be 0.6 percent contrasted to 0.2 percent for hardwoods. Comparison of projected removals, however, shows the greatest difference between rates of increase for softwoods (8.9 percent per year) and hardwoods (1.9 percent per year). The softwood removal rate would be nearly 5 times the rate for hardwoods, reflecting the expected increased importance of softwoods in the State's future. Softwoods amounted to only 13 percent of the State's total removals volume in 1968, but are projected to represent 26 percent of the total by 1998. Growing-stock inventory, too, would be weighted more heavily to softwood species in the future, increasing from 23 percent of the total in 1968 to 27 percent in 1998.

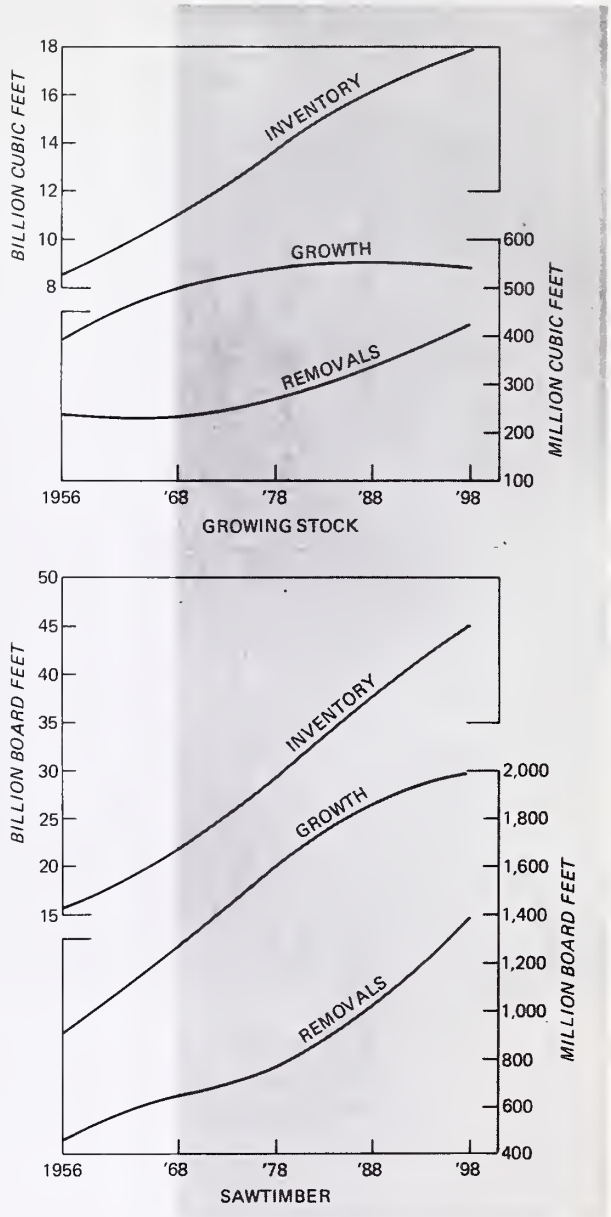

Figure 15. – Removals, net growth, and inventory of growing stock and sawtimber in Wisconsin, 1956 and 1968, and low removals option *projections for 1978-1998.*

The sawtimber projections show a much wider gap between growth and removals than do those for growing stock. Growth would remain far ahead of removals during the entire period, almost paralleling removals in the middle of the period and converging toward removals only in the last decade. Net annual sawtimber growth is projected to increase from 1,264 million board feet in 1968 to 1,997 million board feet in 1998, for an average gain of 1.9 percent per year. Sawtimber removals are projected to more than double during the period, from 650 million board feet in 1968 to 1,387 million board feet in 1998 – an average annual increase of 3.8 percent.

With the above forces impinging on each other, sawtimber inventory is projected to double from the 21.8 billion board feet in 1968 to 45.2 billion board feet in 1998. This would amount to an average annual increase of 3.6 percent, substantially higher than the 2.1 percent annual increase projected for growing-stock inventory. The faster rate of increase for sawtimber inventory is due to the expected continued general growth of trees into the larger diameter classes. As mentioned earlier, sapling and seedling stands dominated the commercial forest during the 1956 survey, and poletimber stands dominated in 1967. Sawtimber stands probably will dominate by 1998 and the increased proportion of sawtimber trees will mean a bigger increase in sawtimber inventory than in growing-stock inventory.

As with growing stock, when sawtimber projections for softwoods and hardwoods are considered separately, some significant differences appear. And, as with growing stock, the softwoods' growth, removals, and inventory are projected to increase at a faster rate than hardwoods, although the softwood volume of each will be less than that of hardwoods throughout the 30-year period.

Softwood sawtimber removals would demonstrate the fastest average annual increase rate of the three with 10.8 percent compared with only 2.5 percent for hardwoods. This high rate would translate into a much bigger share of the total volume of removals for softwoods – from 15 percent of the sawtimber total in 1968 to 30 percent in 1998. The average annual rate of increase for softwood sawtimber growth would be 2.5 percent compared with 1.7 percent for hardwoods. The softwood portion of the total growth volume would creep from 27 percent in 1968 to 30 percent in 1998. A somewhat faster rate of increase for softwood sawtimber inventory than for hardwoods results in a projected gain in the softwood portion of inventory from 30 percent of the total in 1968 to 32 percent in 1998.

Conclusions Drawn from Projections

Out of the above projections there emerge several obvious conclusions.

First, the timber resource is primarily hardwood (largely aspen) and will remain so in the foreseeable future. Because this is true, and because the State's timber economy is predominantly oriented toward pulpwood, Wisconsin will not figure prominently in helping to solve the Nation's forthcoming softwood building materials shortage.

Second, softwood inventories and timber removals will probably expand in the future. This projected mini-renaissance of softwoods will not manifest itself in a return to the Paul Bunyan days when white pine was king. Rather, it results largely from the considerable tree planting done in Wisconsin in the past, most of which favored red pine. Also, part comes from the buildup of shade-tolerant species, such as balsam fir, spruce, and hemlock, that replaced some of the past aspen-birch stands, as mentioned earlier. Probably more of the future increased demand for timber in the State will be met by softwoods.

In addition to the above, there are other changes that may occur in Wisconsin's forests and forest-related industries that are more difficult to predict. Certainly the boom in outdoor recreation and continuing public concern about environmental responsibilities and human amenities will have some impact on the extent and kind of timber harvesting. New harvesting systems, particularly whole-tree chipping in the woods, which is presently being done to a limited extent, will probably supplant older methods in many cases. These systems, though requiring large initial capital outlays, should reduce harvesting costs and help to keep wood products competitive with nonwood materials. Improved methods of transporting timber products to plant or mill seem likely, perhaps including delivery of chips by pipeline directly from the woods.

The intensity of forest management in the future, assumed to continue at the rate indicated by recent trends for the above projections, will probably increase. Cultural work, particularly thinning, probably will be performed over wider areas in stands managed for sawtimber (fig. 16). The increased growing space provided by thinning will help speed up tree growth. Fertilization of forests has also been shown to be effective in accelerating tree growth in other parts of the

Figure 16. — Commercial thinning in a red pine plantation in the Lincoln County Forest. Properly done, thinnings will help to reduce some of the 11 percent of the State's commercial forest area that is overstocked with live trees, and will remove some of the rough and rotten trees that represent 31 percent of the live trees in the State. Thinnings also may yield timber products, such as the pulpwood above. (Photo courtesy of Wisconsin Department of Natural Resources.)

country and probably will be practiced routinely on some land in the State in the future. More of the trees planted in the future will be grown from seeds harvested from genetically superior trees. Pulpwood growers probably will plant trees bred to maximize fiber yield and these trees may be harvested on extremely short rotations.

If the above management practices are to make significant changes in the State's forest situation, they will have to be performed on at least some of the farmer-owned and miscellaneous private commercial forest, which represents 59 percent of the total commercial area. Because such practices require large investments of time and money and may not yield a return for several years or even decades, many owners may be unable or unwilling to apply them. It may be necessary to offer new forms of incentives to encourage more intense management on these generally small holdings.

In summary, the rebuilding of Wisconsin's formerly deteriorated forests may be essentially completed within the next few decades as growth and inventory volumes approach the point of stabilization or even turn down. The hard-won lessons of the past should serve as a reminder of the need for continued thoughtful management to ensure a stable and healthy timber resource and economy.

APPENDIX

Accuracy of Survey

The forest area and timber inventory estimates in this report are based on a carefully designed sample of Wisconsin's forests. Because neither every acre nor every tree in the State was measured, the reported figures are best estimates. A measure of reliability of these estimates is given by a sampling error. Sampling errors (at the 68-percent probability level) have been calculated for commercial forest area, timber inventory, growth, and removals as percentages of the estimated State totals. Separate sampling errors for the latter three have been calculated for both growing stock and sawtimber volumes. Sampling errors may be interpreted as meaning that the chances are two out of three that if a 100-percent inventory had been taken, using the same methods, the results would have been within the limits indicated. For example, the estimated area of commercial forest land in Wisconsin in 1968, 14,536.8 thousand acres, has a sampling error of ±0.38 percent (±55.2 thousand acres). The commercial forest area from a 100-percent inventory, then, would be expected to fall between 14,481.6 and 14,592.0 thousand acres (14,536.8 ± 55.2), there being a one in three chance that this is not the case. Following are sampling errors for total estimated volume, net growth, and removals for both growing stock and sawtimber, and for area of commercial forest land during the 1968 Wisconsin Survey:

Item	*Wisconsin State totals*	*Sampling error*[27] *(Percent)*
Growing-stock:		
Volume	10,996.1 MM cu. ft.	0.86
Growth	500.1 MM cu. ft.	1.77
Removals	233.1 MM cu. ft.	3.96
Sawtimber:		
Volume	21,755.7 MM bd. ft.	1.81
Growth	1,263.7 MM bd. ft.	2.95
Removals	650.2 MM bd. ft.	3.85
Commercial forest land	14,536.8 M acres	.38

In addition to sampling errors, there may be other nonsampling errors due to mistakes in judgment, recording, calculation, and compilation. The magnitude of such errors cannot be determined. However, they are minimized through training, supervision, field checking, and complete editing and machine verification in compiling the data.

As survey data are broken down into units smaller than the State totals, the sampling error for such breakdowns increases. The smaller the breakdown, the larger the sampling error. For example, the sampling error for area of commercial forest land in a particular county is much higher than that for total commercial area in the State. An approximation of the increasing sampling error can be obtained from table 10, which shows the sampling error associated with estimates smaller than totals in Wisconsin.

Survey Procedure

This inventory of the forests of Wisconsin combines data furnished by the staffs of the Nicolet and Chequamegon National Forests for those forests and data gathered by personnel of the Wisconsin Department of Natural Resources and the North Central Forest Experiment Station on all other land. Permanent sample plots were established on the Nicolet National Forest in 1963 and remeasured in 1967. Similar plots on the Chequamegon National Forest were established in 1964. Data from both forests were updated to the current survey year. Forest Survey sample plots were measured from June 1967 to December 1969.

National Forest Land

A total of 117 ten-point variable-radius plots were originally established on the Nicolet National Forest, and 95 of these plots were remeasured to obtain growth data. On the Chequamegon National Forest 127 ten-point variable-radius plots were established. Annual growth data were estimated using regression equations with input from outside the National Forest.

Outside National Forest Land

A triple sampling design was used for land outside the National Forests. First, 320,815 points distributed systematically across aerial photos of the entire area were observed. These points were classified as either forest land (139,867) or nonforest land (180,948) in order to make a preliminary estimate of forest area. Next, 46,104 of the forest points were stereoclassified as to forest type,

[27] *At the 68-percent probability level.*

Table 10. – Sampling errors[1] for estimates smaller than State totals of volume, net growth, and removals, and of area of commercial forest land in Wisconsin, 1968

Sampling error (percent)	Commercial forest	Growing stock			Sawtimber		
		Inventory	Growth	Removals	Inventory	Growth	Removals
	Thousand acres	Million cubic feet			Million board feet		
1	2,071.5	8,132.7	1,566.8	3,656.5	71,233.6	10,997.0	9,638.3
2	517.9	2,033.2	391.7	914.1	17,808.4	2,749.3	2,409.6
3	230.2	903.6	174.0	406.3	7,914.8	1,221.9	1,070.9
4	129.5	508.3	97.9	228.5	4,452.1	687.3	602.4
5	82.9	325.3	62.7	146.3	2,849.3	439.9	385.5
10	20.7	81.3	15.7	36.6	712.3	110.0	96.4
15	9.2	36.1	7.0	16.3	316.5	48.9	42.8
20	5.2	20.3	3.9	9.1	178.0	27.5	24.1
25	3.3	13.0	2.5	5.9	113.9	17.6	15.4
50	.8	3.2	.6	1.5	28.4	4.4	3.8
100	.2	.8	.2	.4	7.1	1.0	.9

1/ At the 68-percent probability level.

stand-size class, and density. Then 6,419 points classed as forest and 7,960 points classed as nonforest were examined on the ground to correct the preliminary area estimate for errors in classification and for actual changes in land use since the photos were taken. At each of the 6,017 commercial forest locations, 10 variable-radius plots (37.5 basal area factor) were established uniformly over the sample acre.

Growth information on land outside the National Forests was obtained by remeasuring 105 one-fifth-acre circular plots in the three northern Forest Survey Units and 292 one-fifth-acre circular plots on which 10-point variable-radius plots were superimposed in the two southern units.

Mortality information was gained by counting trees that died within the last 3 years on newly established variable radius plots, then converting these trees to an annual volume of mortality.

Timber Utilization

Statistics on utilization in 1967 were obtained from mill surveys and wood utilization studies. The Wisconsin Department of Natural Resources conducted a canvass of resident sawmills, veneer mills, and other primary wood-using plants. The North Central Forest Experiment Station canvassed pulpmills and the mining industry in Wisconsin as well as out-of-State sawmills, pulpmills, and veneer mills to determine their use of timber from Wisconsin. Fuelwood and fencepost output was based on U.S. Census of Agriculture and Housing figures, a canvass of public and industrial timber owners, and estimates of mill residues used for fuelwood determined from a canvass of Wisconsin primary wood-using plants. Timber cut for products by owner class was determined by a canvass of all public and industrial timber owners. The portion of timber cut unaccounted for by the latter owners was grouped under "farmer and other owners."

To develop wood utilization factors used in converting timber products output to timber removals for saw logs, veneer logs, and pulpwood, 919 felled trees throughout the State were measured. Similar factors for cooperage logs and hardwood fenceposts were used from the 1960-61 Minnesota utilization study, and factors for all other products were used from the 1964-65 Michigan utilization study.

Definition of Terms

Land-Use Classes

Gross area—The entire area of land and water as determined by the Bureau of Census, 1960.

Land area – The area of dry land and land temporarily or partially covered by water such as marshes, swamps, flood plains, streams, sloughs, and estuaries. Canals less than 1/8-mile wide, and lakes, reservoirs, and ponds smaller than 40 acres are included as land area. These figures are from the Bureau of Census, 1960.

Forest land – Land at least 16.7 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for nonforest use. Includes afforested areas. The minimum forest area classified was 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas were classed as forest if less than 120 feet in width.

Commercial forest land – Forest land which is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for growing crops of industrial wood generally of a site quality capable of producing in excess of 20 cubic feet per acre of annual growth. This includes both inaccessible and inoperable areas.

Noncommercial forest land – (a) Unproductive – forest land incapable of yielding crops of industrial wood because of adverse site conditions. (b) Productive-reserved – forest land withdrawn from commercial timber use through statute or administrative regulation, or exclusively used for Christmas tree production.

Nonforest land – Land that has never supported forests, and land formerly forested where forest use is precluded by development for nonforest uses, such as cropland, improved pasture, residential areas, and city parks. Also includes improved roads and adjoining rights-of-way, powerline clearings, and certain areas of water classified by the Bureau of Census as land. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forest areas must be more than 1 acre in size, to qualify as nonforest land. "Cropland" and "pasture and range" figures were obtained from the Bureau of Census.

Ownership Classes

National forest – Federal land that has been designated by Executive Order or Statute as National Forests or purchase units, and other land under the administration of the Forest Service.

Indian – Tribal land held in fee by the Federal Government but administered for Indian tribal groups and Indian trust allotments.

Miscellaneous Federal – Federal land other than National Forest, Bureau of Land Management, and Indian land.

State, county, and municipal – Land owned by States, counties, or local public agencies, or land leased by them for more than 50 years.

Other public – All public land other than National Forests.

Forest industry – Land owned by companies or individuals operating wood-using plants.

Farmer-owned – Land owned by operators of farms. A farm must include 10 or more acres from which the sale of agricultural products totals $50 or more annually or, if less than 10 acres, the yield must be at least $250 annually.

Miscellaneous private – Privately owned land other than forest-industry or farmer-owned.

Tree Classes

All live trees – Growing-stock, rough, and rotten trees 1 inch d.b.h. and larger.

Growing-stock trees – All live trees of any size except rough and rotten trees.

Desirable trees – Growing-stock trees having no serious defects in quality limiting present or prospective use, and of relatively high vigor and containing no pathogens that may result in death or serious deterioration before rotation age. These are trees that would be favored by forest managers in silvicultural operations.

Acceptable trees – Trees meeting the standards for growing stock but not qualifying as desirable trees.

Sawtimber trees – Live trees of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs, each 8 feet or longer, and having a maximum allowable defect of 67 percent of the gross tree volume. Softwoods must be at least 9.0 inches d.b.h. and hardwoods at least 11.0 inches.

Poletimber trees – Live trees of commercial species at least 5.0 inches d.b.h. but smaller than sawtimber size, and of good form and vigor.

Saplings – Live trees of commercial species 1.0 to 5.0 inches d.b.h. and of good form and vigor.

Seedlings – Live trees of commercial species less than 1.0 inch d.b.h. that are expected to survive according to regional standards. (Example of seedlings not expected to survive are those that are diseased or heavily damaged by logging, browsing, or fire.) Only softwood seedlings over 6 inches and hardwood seedlings over 1 foot in height are counted.

Rotten trees – Live trees (of any size) of commercial species that do not contain a merchantable 12-foot saw log, now or prospectively, because of rot (that is, when more than 50 percent of the cull volume of the tree is rotten).

Rough trees – Live trees (of any size) that do not contain at least one merchantable 12-foot saw log, now or prospectively, because of roughness, poor form, or noncommercial species.

Short-log trees (rough trees) – Sawtimber-sized trees of commercial species that contain at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

Stocking

The degree of utilization of land by trees as measured in terms of basal area and/or the number of trees in a stand compared to the basal area and/or number of trees required to utilize fully the growth potential of the land.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees do reach 5 inches d.b.h.

Stocking of all live trees, growing-stock trees, and desirable trees are recorded separately and stands are grouped into stocking classes.

Stocking Classes

Overstocked stands – Stands in which stocking of trees is 133 percent or more.

Fully stocked stands – Stands in which stocking of trees is from 100 to 133 percent.

Medium-stocked stands – Stands in which stocking of trees is from 60 to 100 percent.

Poorly stocked stands – Stands in which stocking of trees is from 16.7 to 60 percent.

Nonstocked areas – Commercial forest land on which stocking of trees is less than 16.7 percent.

Stand-Size Classes

Stand – A growth of trees on a minimum of 1 acre of forest land that is at least 16.7 percent stocked by forest trees of any size.

Sawtimber stands – Stands at least 16.7 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber or poletimber trees and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands – Stands at least 16.7 percent stocked with growing-stock trees, and with half or more of this stocking in sawtimber and/or poletimber trees and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands – Stands at least 16.7 percent stocked with growing-stock trees and with saplings and/or seedlings comprising more than half of this stocking.

Nonstocked areas – Commercial forest land on which stocking of growing-stock trees is less than 16.7 percent.

Area-Condition Classes

Class 10 –Areas fully stocked with desirable trees and not overstocked.

Class 20 – Areas fully stocked with desirable trees, but overstocked with all live trees.

Class 30 – Areas medium to fully stocked with desirable trees, and with less than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class 40 – Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees and/or conditions that ordinarily prevent occupancy by desirable trees.

Class 50 – Areas poorly stocked with desirable trees, but fully stocked with growing-stock trees.

Class 60 – Areas poorly stocked with desirable trees, but with medium to full stocking of growing-stock trees.

Class 70 – Areas poorly stocked with desirable trees, and poorly stocked with growing-stock trees.

Other Land Classifications

Site index – An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Site classes – A classification of forest land in terms of inherent capacity to grow crops of industrial wood expressed in cubic-foot growth per acre per year.

Stand-age – Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Basal area – The area in square feet of the cross section at breast height of a single tree. When the basal area of all the trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Forest Types

A classification of forest land based upon the species forming a plurality of live-tree stocking. Major forest types in Wisconsin are:

Jack pine – Forests in which pine species comprise a plurality of the live tree stocking, with jack pine the most common. (Common associates include aspen, white birch, maple, balsam fir, cherry, and oak.)

Red pine – Forests in which pine species comprise a plurality of the live-tree stocking, with red pine the most common. (Common associates include aspen, white birch, maple, balsam fir, and red oak.)

White pine – Forests in which pine species comprise a plurality of the live-tree stocking, with eastern white pine the most common. (Common associates include hemlock, aspen, white and yellow birch, and maple.)

Balsam fir-white spruce – Forests in which balsam fir or white spruce, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include white-cedar, black spruce, tamarack, maple, birch, hemlock, and aspen.)

Black spruce – Forests in which swamp conifers (black spruce, tamarack, and northern white-cedar) comprise a plurality of the live-tree stocking, with black spruce the most common.

Northern white-cedar – Forests in which swamp conifers comprise a plurality of live-tree stocking, with northern white-cedar the most common.

Tamarack – Forests in which swamp conifers comprise a plurality of live-tree stocking, with tamarack the most common.

Oak-hickory – Forests in which upland oaks or hickories, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include aspen, cherry, balsam fir, elm, maple, and white birch.)

Elm-ash-cottonwood – Forests in which lowland elm, ash, or cottonwood, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include maple, basswood, and river birch.) These forests may be subtyped cottonwood when it is the most common species.

Maple-beech-birch – Forests in which maple, beech, yellow birch, or upland elm, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include hemlock, elm, basswood, white pine, and white and yellow birch.) Locally this type is called "northern hardwoods."

Aspen – Forests in which a mixture of quaking or bigtooth aspen, or balsam poplar, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include maple, white birch, balsam fir, red and northern pin oak, and cherry.)

Paper birch – Forests in which paper birch comprises a plurality of the live-tree stocking. (Common associates include aspen, maple, balsam fir, red and northern pin oak, and cherry.)

Timber Volume

Volume of growing stock – The volume of sound wood in the bole of sawtimber and poletimber trees from stump to a minimum of 4.0-inch top diameter outside bark, or to the point where the central stem breaks into limbs. Growing-stock volumes are shown in cubic feet but may be converted into solid-wood cords by dividing by 79.

Volume of sawtimber – Net volume of the saw log portion of live sawtimber trees in board feet, International 1/4-inch rule, from stump to a minimum 7 inches top diameter outside bark for softwoods and 9 inches for hardwoods.

Upper stem portion – That part of the bole of sawtimber trees above the merchantable top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Quality Classes

Tree grade – Classification of trees based on external characteristics as indicators of quality. Hardwood species were graded in accordance with "Hardwood Log Grades for Standard Lumber and How to Use Them" issued by the Forest Products Laboratory under the designation D1737A, 1961, and USDA Forest Service standards for hardwood tie and timber logs. The best 12-foot section of the lowest 16-foot hardwood log, or the best 12-foot upper section if the butt log did not meet minimum log-grade standards was graded.

Red pine was graded in accordance with "Interim Southern Pine Log Grades," USDA Forest Service, 1953. Eastern white pine was graded in accordance with USDA Forest Service "Log Grades for Eastern White Pine." All other softwoods were graded according to "Specifications for Log Grades of Hardwoods and Softwoods," Northern Hemlock and Hardwood Association, 1947. The lowest 16-foot log in softwood trees or a shorter log down to 12 feet if a 16-foot butt log was not present was graded.

Growth and Mortality

Net annual growth of growing stock – The annual change in volume of sound wood in live sawtimber and poletimber trees and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

Net annual growth of sawtimber – The annual change in volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

Mortality of growing stock – The volume of sound wood in live sawtimber and poletimber trees dying annually from natural causes. Natural causes include fire, insects, disease, animal damage, weather, and suppression.

Mortality of sawtimber – The net board-foot volume of sawtimber trees dying annually from natural causes.

Timber Removals

Timber removals from growing stock – The volume of sound wood in live sawtimber and poletimber trees removed annually for forest products (including roundwood products and logging residues) and for other removals. Roundwood products are logs, bolts, or other round sections cut from trees. Logging residues are the unused portions of cut trees plus unused trees killed by logging. Other removals are growing-stock trees removed by cultural operations such as timber stand improvement work, and by land clearing and changes in land use.

Timber removals from sawtimber – The net board-foot volume of live sawtimber trees removed for forest products annually (including roundwood products and logging residues) and for other removals.

Timber products output – All timber products cut from roundwood, and byproducts of wood-manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulp chips or other products.

Plant byproducts – Wood products, such as pulpwood chips, obtained incidental to production of other manufactured products.

Plant residues – Wood materials from manufacturing plants not utilized for some product.

Principal Tree Species in Wisconsin [28]

SOFTWOOD SPECIES

White and red pines:
- Eastern white pine . . . . . *Pinus strobus*
- Red pine . . . . . *Pinus resinosa*

Jack pine . . . . . *Pinus banksiana*

Spruce and balsam fir:
- White spruce . . . . . *Picea glauca*
- Black spruce . . . . . *Picea mariana*
- Balsam fir . . . . . *Abies balsamea*

Eastern hemlock . . . . . *Tsuga canadensis*

Other eastern softwoods:
- Tamarack . . . . . *Larix laricina*
- Northern white-cedar . . . *Thuja occidentalis*

Other softwoods
- Scotch pine . . . . . *Pinus sylvestris*
- Eastern redcedar . . . *Juniperus virginiana*
- Norway spruce . . . . . *Picea abies*

HARDWOOD SPECIES

Select white oaks:
- White oak . . . . . *Quercus alba*
- Bur oak . . . . . *Quercus macrocarpa*
- Chinkapin oak . . . . *Quercus muehlenbergii*
- Swamp white oak . . . . . *Quercus bicolor*

Select red oaks:
- Northern red oak . . . . . *Quercus rubra*

Other red oaks:
- Black oak . . . . . *Quercus velutina*
- Pin oak . . . . . *Quercus palustris*

Hickory:
- Bitternut hickory . . . . *Carya cordiformis*
- Shagbark hickory . . . . . *Carya ovata*
- Yellow birch . . . . . *Betula alleghaniensis*

Hard maple:
- Black maple . . . . . *Acer nigrum*
- Sugar maple . . . . . *Acer saccharum*

Soft maple:
- Red maple . . . . . *Acer rubrum*
- Silver maple . . . . . *Acer saccharinum*

American beech . . . . . *Fagus grandifolia*

Ash:
- Black ash . . . . . *Fraxinus nigra*
- White ash . . . . . *Fraxinus americana*
- Green ash . . . . . *Fraxinus pennsylvanica*

Cottonwood and aspen:
- Balsam poplar . . . . . *Populus balsamifera*
- Bigtooth aspen . . . . *Populus grandidentata*
- Quaking aspen . . . . *Populus tremuloides*
- Eastern cottonwood . . . . *Populus deltoides*

American basswood . . . . . *Tilia americana*
Black walnut . . . . . *Juglans nigra*
Black cherry . . . . . *Prunus serotina*
American elm . . . . . *Ulmus americana*
Rock elm . . . . . *Ulmus thomasii*
Slippery elm . . . . . *Ulmus rubra*
Paper birch . . . . . *Betula papyrifera*
Butternut . . . . . *Juglans cinerea*

Other hardwoods:
- Hackberry . . . . . *Celtis occidentalis*
- American sycamore . . . *Platanus occidentalis*
- Red mulberry . . . . . *Morus rubra*
- Blackgum . . . . . *Nyssa sylvatica*
- Black willow . . . . . *Salix nigra*
- Boxelder . . . . . *Acer negundo*
- Honeylocust . . . . . *Gleditsia triacanthos*
- Black locust . . . . . *Robinia pseudoacacia*
- River birch . . . . . *Betula nigra*
- Northern catalpa . . . . . *Catalpa speciosa*

[28] *The common and scientific names are based on "Check List of Native and Naturalized Trees of the United States (Including Alaska)" by Elbert L. Little, Jr., U.S. Dep. Agric., Agric. Handb. 41, 472 p. 1953.*

Tables[29]

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1. Commercial forest land area by stand-size class, 1956 and 1968 (see page 4)

2. Number of growing-stock trees on commercial forest land by diameter class, 1956 and 1968 (see page 5)

3. Area change between surveys, by stand-size class, Wisconsin, 1956-68, and Michigan, 1955-66 (see page 5)

4. Commercial forest area by forest type, 1956 and 1968 (see page 6)

5. Area of commercial forest land by site index class for selected forest types (see page 8)

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8. Percent of sawtimber trees by butt log grade and softwoods and hardwoods (see page 12)

9. Volume of net annual growth by components of growth, Wisconsin, 1967, and Michigan, 1965 (see page 13)

10. Sampling errors for estimates smaller than State totals of volume, net growth, and removals, and of area of commercial forest land (see page 25)

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13. Area of commercial forest land, by stand-size and ownership class, and Forest Survey Unit

14. Area of commercial forest land, by stand-volume and ownership class

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16. Area of commercial forest land, by area-condition and ownership class

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30. Area of noncommercial forest land, by ownership class

[29] *Tables containing growth, mortality, removals, and forest industry information are dated 1967. Tables containing forest area and timber inventory information are dated 1968 and represent conditions as of January 1, 1968, following changes to the area and inventory estimated to have occurred during calendar year 1967.*

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31. Number of live trees on commercial forest land, by species and diameter class

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33. Number of growing-stock trees on commercial forest land, by species group, diameter class, and Forest Survey Unit

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39. Net volume of sawtimber on commercial forest land, by species and diameter class

40. Net volume of growing stock on commercial forest land, by species and Forest Survey Unit

41. Net volume of sawtimber on commercial forest land, by species and Forest Survey Unit

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43. Net volume of sawtimber on commercial forest land, by species and forest type

44. Net volume of growing stock on commercial forest land, by county and species group

45. Net volume of sawtimber on commercial forest land, by county and species group

46. Net volume of growing stock, sawtimber, and rough, rotten, and short-log trees (cull) on commercial forest land, by species

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50. Net annual growth of sawtimber on commercial forest land, by species and diameter class

51. Net annual growth of growing stock on commercial forest land, by species and Forest Survey Unit

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60. Net annual growth and removals of sawtimber on commercial forest land, by ownership class and softwoods and hardwoods

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63. Annual mortality of growing stock and sawtimber on commercial forest land, by cause and softwoods and hardwoods

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66. A comparison of the number of primary woodusing plants operating in 1956 and 1967, by Forest Survey Unit

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69. Removals, net annual growth, and inventory of growing stock and sawtimber on commercial forest land, Wisconsin, 1968, and low removals option projections to 1998

70. Removals, net annual growth, and inventory of growing stock and sawtimber on commercial forest land, Wisconsin, 1968, and high removals option projections to 1998

Table 11. – Area by land class and Forest Survey Unit, Wisconsin, 1968
(Thousand acres)

Land class	All units	Northeastern	Northwestern	Central	Southwestern	Southeastern
Forest land:						
Commercial	14,536.8	4,062.0	5,246.4	2,831.8	1,493.1	903.5
Productive reserved	34.2	1.8	5.5	3.9	12.3	10.7
Unproductive	374.4	151.2	178.9	21.7	7.0	15.6
Total	14,945.4	4,215.0	5,430.8	2,857.4	1,512.4	929.8
Nonforest land:						
Cropland[1/]	12,043.3	751.4	1,043.0	2,489.7	2,935.5	4,823.7
Pasture and range	1,845.1	86.6	243.2	423.3	743.3	348.7
Other[2/]	6,024.7	628.8	1,220.5	1,430.9	987.9	1,756.6
Total	19,913.1	1,466.8	2,506.7	4,343.9	4,666.7	6,929.0
Total area[3/]	34,858.5	5,681.8	7,937.5	7,201.3	6,179.1	7,858.8

1/ Source: 1964 Census of Agriculture.
2/ Includes swampland, industrial and urban areas, other nonforest land, and 138,400 acres, classed as water by forest survey standards, but defined by the Bureau of the Census as land.
3/ Source: United States Bureau of the Census, Land and Water Area of the United States, 1960.

Table 12. — Area of commercial forest land, by ownership class and Forest Survey Unit, Wisconsin, 1968
(Thousand acres)

Ownership class	All units	Northeastern	Northwestern	Central	Southwestern	Southeastern
National Forest	1,317.7	575.9	741.8	--	--	--
Other Federal:						
Indian	156.5	53.5	97.5	4.0	0.2	1.3
Miscellaneous Federal	118.3	9.9	1.4	83.4	14.1	9.5
Total other Federal	274.8	63.4	98.9	87.4	14.3	10.8
State	568.0	210.3	185.8	105.9	20.0	46.0
County and municipal	2,365.7	665.2	1,281.7	405.4	4.3	9.1
Forest industry[1/]	1,368.1	743.8	508.9	105.7	6.5	3.2
Farmer-owned	4,809.0	495.7	1,174.3	1,283.0	1,234.4	621.6
Miscellaneous private:						
Individual	3,343.3	1,146.8	1,088.8	756.2	179.6	171.9
Corporate	490.2	160.9	166.2	88.2	34.0	40.9
Total miscellaneous private	3,833.5	1,307.7	1,255.0	844.4	213.6	212.8
All ownerships	14,536.8	4,062.0	5,246.4	2,831.8	1,493.1	903.5

1/ Not including 60.6 thousand acres of farmer-owned and miscellaneous private lands leased to forest industry.

Table 13. — Area of commercial forest land, by stand-size and ownership class, and Forest Survey Unit, Wisconsin, 1968
(Thousand acres)

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
All units:					
Sawtimber	3,098.4	84.3	406.6	346.2	2,261.3
Poletimber	6,579.5	749.2	1,636.5	599.0	3,594.8
Sapling and seedling	4,489.2	420.2	1,101.6	418.1	2,549.3
Nonstocked areas	369.7	64.0	63.8	4.8	237.1
All classes	14,536.8	1,317.7	3,208.5	1,368.1	8,642.5
Northeastern unit:					
Sawtimber	721.5	62.5	85.3	267.1	306.6
Poletimber	2,010.1	339.7	506.8	295.4	868.2
Sapling and seedling	1,276.2	158.5	332.5	178.6	606.6
Nonstocked areas	54.2	15.2	14.3	2.7	22.0
All classes	4,062.0	575.9	938.9	743.8	1,803.4
Northwestern unit:					
Sawtimber	642.6	21.8	244.0	52.9	323.9
Poletimber	2,829.3	409.5	827.9	263.0	1,328.9
Sapling and seedling	1,642.2	261.7	468.8	190.9	720.8
Nonstocked areas	132.3	48.8	25.7	2.1	55.7
All classes	5,246.4	741.8	1,566.4	508.9	2,429.3
Central unit:					
Sawtimber	551.8	--	44.0	20.4	487.4
Poletimber	1,100.6	--	272.2	37.6	790.8
Sapling and seedling	1,078.4	--	264.2	47.7	766.5
Nonstocked areas	101.0	--	18.3	--	82.7
All classes	2,831.8	--	598.7	105.7	2,127.4
Southwestern unit:					
Sawtimber	803.3	--	14.7	4.3	784.3
Poletimber	402.6	--	12.0	2.2	388.4
Sapling and seedling	238.1	--	10.4	--	227.7
Nonstocked areas	49.1	--	1.5	--	47.6
All classes	1,493.1	--	38.6	6.5	1,448.0
Southeastern unit:					
Sawtimber	379.2	--	18.6	1.5	359.1
Poletimber	236.9	--	17.6	.8	218.5
Sapling and seedling	254.3	--	25.7	.9	227.7
Nonstocked areas	33.1	--	4.0	--	29.1
All classes	903.5	--	65.9	3.2	834.4

Table 14. – Area of commercial forest land, by stand-volume and ownership class, Wisconsin, 1968
(Thousand acres)

Stand volume per acre[1/] (board feet)	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Less than 1,500	9,928.2	894.5	2,461.3	815.1	5,757.3
1,500 to 5,000	3,606.8	353.4	603.6	354.8	2,295.0
More than 5,000	1,001.8	69.8	143.6	198.2	590.2
All classes	14,536.8	1,317.7	3,208.5	1,368.1	8,642.5

1/ International 1/4-inch rule.

Table 15. – Area of commercial forest land, by stocking class based on selected stand components, Wisconsin, 1968
(Thousand acres)

Stocking percentage	Stocking classified in terms of					
	All trees	Growing-stock trees			Rough and rotten trees	Inhibiting vegetation
		Total	Desirable	Acceptable		
160+	168.2	55.3	--	7.1	--	--
150 to 160	184.2	49.0	--	10.6	--	--
140 to 150	565.8	160.7	--	93.0	--	--
133 to 140	733.9	256.3	--	148.7	1.4	--
130 to 133	408.5	142.7	--	82.7	.8	--
120 to 130	1,526.1	596.5	--	454.7	--	--
110 to 120	1,907.5	957.2	8.0	841.7	--	--
100 to 110	2,106.5	1,228.3	20.8	1,210.6	18.5	--
90 to 100	2,002.6	1,364.2	60.9	1,407.3	43.8	17.7
80 to 90	1,472.2	1,497.8	72.4	1,650.2	95.6	13.3
70 to 80	1,250.4	1,554.0	54.7	1,629.2	186.2	7.5
60 to 70	788.4	1,621.8	58.0	1,647.3	456.0	9.8
50 to 60	478.9	1,416.8	166.1	1,536.3	847.2	45.5
40 to 50	352.0	1,074.2	104.2	1,128.4	1,370.6	74.0
30 to 40	255.3	1,050.2	142.2	1,128.1	1,984.1	94.4
20 to 30	117.6	703.7	233.0	723.9	2,852.0	167.9
17 to 20	34.6	194.9	230.7	205.3	1,524.5	140.5
10 to 17	41.3	232.9	275.7	245.3	1,821.7	167.9
Less than 10	142.8	380.3	13,110.1	386.4	3,334.4	13,798.3
Total	14,536.8	14,536.8	14,536.8	14,536.8	14,536.8	14,536.8

Table 16. – Area of commercial forest land, by area-condition and ownership class, Wisconsin, 1968
(Thousand acres)

Area-condition class	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
10	16.4	16.4	--	--	--
20	28.8	28.8	--	--	--
30	229.9	227.4	--	0.2	2.3
40	482.8	480.4	--	--	2.4
50	3,344.3	416.1	723.6	532.4	1,672.2
60	5,700.4	84.6	1,497.2	570.4	3,548.2
70	4,734.2	64.0	987.7	265.1	3,417.4
All classes	14,536.8	1,317.7	3,208.5	1,368.1	8,642.5

Table 17. – Area of commercial forest land, by site and ownership class, Wisconsin, 1968
(Thousand acres)

Site class (cubic feet)	All owners	National Forest	Other public	Forest industry	Farmer and miscellaneous private
165 or more	15.3	1.8	1.7	0.3	11.5
120 to 165	168.7	17.5	39.7	28.1	83.4
85 to 120	1,489.5	206.2	304.0	134.7	844.6
50 to 85	5,189.1	733.4	1,208.4	491.1	2,756.2
Less than 50	7,674.2	358.8	1,654.7	713.9	4,946.8
All classes	14,536.8	1,317.7	3,208.5	1,368.1	8,642.5

Table 18. – Area of commercial forest land, by forest types and ownership class, Wisconsin, 1968
(Thousand acres)

Forest types	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Jack pine	727.6	57.3	249.3	113.0	308.0
Red pine	310.2	77.6	79.9	37.6	115.1
White pine	177.6	19.5	37.3	18.2	102.6
Balsam fir-white spruce	628.0	116.4	155.1	96.9	259.6
Black spruce	235.9	30.4	56.4	46.9	102.2
Northern white-cedar	302.4	83.5	47.1	31.0	140.8
Tamarack	222.2	7.9	59.4	13.8	141.1
Oak-hickory	2,664.9	29.5	326.0	86.5	2,222.9
Elm-ash-cottonwood	1,157.6	41.5	267.1	101.3	747.7
Maple-beech-birch	3,521.6	417.6	603.7	468.3	2,032.0
Aspen	3,664.6	324.3	1,116.2	303.1	1,921.0
Paper birch	554.5	48.2	147.2	46.7	312.4
Nonstocked	369.7	64.0	63.8	4.8	237.1
All types	14,536.8	1,317.7	3,208.5	1,368.1	8,642.5

Table 19. – Area of noncommercial forest land, by forest type, Wisconsin, 1968
(Thousand acres)

Forest type	All areas	Productive reserve areas	Unproductive areas
Jack pine	5.4	0.5	4.9
Red pine	4.5	2.2	2.3
White pine	2.5	.2	2.3
Balsam fir-white spruce	22.2	.6	21.6
Black spruce	127.2	--	127.2
Northern white-cedar	16.5	--	16.5
Tamarack	53.8	--	53.8
Oak-hickory	25.3	13.9	11.4
Elm-ash-cottonwood	104.3	1.7	102.6
Maple-beech-birch	10.3	7.4	2.9
Aspen	21.5	6.7	14.8
Paper birch	2.4	--	2.4
Nonstocked	12.7	1.0	11.7
All types	408.6	34.2	374.4

Table 20. – Area of land and forest land by county, Wisconsin, 1968

County	Land area	Forest land			Commercial forest as a percent of land area
		All forest	Non-commercial	Commercial	
	(Thousand acres)				(percent)
Adams	413.6	252.9	2.1	250.8	61
Ashland	664.2	548.0	21.4	526.6	79
Barron	553.1	155.0	2.1	152.9	28
Bayfield	934.3	789.5	12.2	777.3	83
Brown	335.6	37.6	.7	36.9	11
Buffalo	454.8	166.9	1.0	165.9	36
Burnett	537.8	324.6	7.3	317.3	59
Calumet	206.3	26.7	1.2	25.5	12
Chippewa	651.3	213.9	2.5	211.4	32
Clark	781.5	279.8	3.0	276.8	35
Columbia	496.5	82.9	.8	82.1	16
Crawford	363.3	131.5	.7	130.8	36
Dane	766.9	74.6	.3	74.3	10
Dodge	569.0	43.5	.8	42.7	8
Door	314.5	105.2	9.0	96.2	31
Douglas	835.0	631.9	21.0	610.9	73
Dunn	545.8	139.3	.3	139.0	25
Eau Claire	414.3	158.9	1.4	157.5	38
Florence	311.9	269.3	6.6	262.7	84
Fond du Lac	463.9	50.6	1.9	48.7	10
Forest	644.7	549.5	21.8	527.7	82
Grant	734.1	150.5	2.9	147.6	20
Green	374.2	31.8	.5	31.3	8
Green Lake	226.8	28.1	.4	27.7	12
Iowa	487.9	123.9	3.1	120.8	25
Iron	478.1	389.5	15.6	373.9	78
Jackson	639.3	348.7	3.2	345.5	54
Jefferson	361.0	33.0	.9	32.1	9
Juneau	495.4	240.7	1.1	239.6	48
Kenosha	174.3	9.9	--	9.9	6
Kewaunee	211.0	32.1	1.2	30.9	15
La Crosse	288.5	94.7	.4	94.3	33
Lafayette	411.5	34.9	.3	34.6	8
Langlade	548.1	395.9	13.7	382.2	70
Lincoln	570.8	413.3	14.2	399.1	70
Manitowoc	377.3	61.3	1.0	60.3	16
Marathon	1,015.2	377.8	4.0	373.8	37
Marinette	881.8	675.7	25.8	649.9	74
Marquette	291.2	101.2	1.3	99.9	34
Milwaukee	151.4	--	--	--	--
Monroe	585.3	219.4	.9	218.5	37
Oconto	640.2	365.4	7.7	357.7	56
Oneida	711.4	604.0	37.4	566.6	80
Outagamie	406.0	69.9	.8	69.1	17
Ozaukee	150.8	15.1	.4	14.7	10
Pepin	150.2	44.3	.2	44.1	29
Pierce	377.7	62.9	.3	62.6	17
Polk	595.8	222.6	4.6	218.0	37
Portage	515.9	160.8	1.3	159.5	31
Price	806.4	655.2	47.0	608.2	75
Racine	215.4	15.2	.5	14.7	7
Richland	373.2	104.2	1.0	103.2	28
Rock	461.4	31.7	1.0	30.7	7
Rusk	579.5	336.1	7.0	329.1	57
St. Croix	470.3	49.9	.4	49.5	11
Sauk	538.4	156.5	4.4	152.1	28
Sawyer	806.1	644.8	23.4	621.4	77
Shawano[1/]	818.3	496.1	10.7	485.4	59
Sheboygan	323.4	48.2	1.3	46.9	14
Taylor	624.2	381.5	12.5	369.0	59
Trempealeau	470.3	111.1	1.8	109.3	23
Vernon	513.1	141.8	2.5	139.3	27
Vilas	554.6	445.8	15.1	430.7	78
Walworth	356.2	26.6	1.0	25.6	7
Washburn	523.0	352.1	10.3	341.8	65
Washington	274.5	36.8	.7	36.1	13
Waukesha	355.5	47.9	1.5	46.4	13
Waupaca	480.3	166.4	2.2	164.2	34
Waushara	401.5	119.3	1.0	118.3	29
Winnebago	286.9	21.1	.4	20.7	7
Wood	516.5	217.6	1.6	216.0	42
Total	34,858.5	14,945.4	408.6	14,536.8	42

1/ Shawano county includes Menominee county.

Table 21. — Area of commercial forest land, by forest type, stand-size class, and Forest Survey Unit, Wisconsin, 1968
(Thousand acres)

Forest type	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Non-stocked areas
All Units:					
Jack pine	727.6	45.0	360.3	322.3	--
Red pine	310.2	46.8	90.6	172.8	--
White pine	177.6	115.6	25.7	36.3	--
Balsam fir-white spruce	628.0	48.9	345.2	233.9	--
Black spruce	235.9	6.8	40.4	188.7	--
Northern white-cedar	302.4	43.7	180.7	78.0	--
Tamarack	222.2	4.8	89.5	127.9	--
Oak-hickory	2,664.9	1,028.3	1,046.3	590.3	--
Elm-ash-cottonwood	1,157.6	345.0	498.2	314.4	--
Maple-beech-birch	3,521.6	1,254.8	1,599.9	666.9	--
Aspen	3,664.6	138.8	1,937.8	1,588.0	--
Paper birch	554.5	19.9	364.9	169.7	--
Nonstocked	369.7	--	--	--	369.7
All types	14,536.8	3,098.4	6,579.5	4,489.2	369.7
Northeastern Unit:					
Jack pine	130.7	18.3	68.9	43.5	--
Red pine	122.2	24.9	30.4	66.9	--
White pine	64.1	46.1	7.0	11.0	--
Balsam fir-white spruce	310.0	29.2	158.4	122.4	--
Black spruce	132.1	5.9	21.0	105.2	--
Northern white-cedar	166.8	14.1	107.6	45.1	--
Tamarack	68.6	--	33.8	34.8	--
Oak-hickory	212.2	51.3	100.3	60.6	--
Elm-ash-cottonwood	261.4	81.1	118.2	62.1	--
Maple-beech-birch	1,189.1	407.7	578.3	203.1	--
Aspen	1,196.0	32.1	673.7	490.2	--
Paper birch	154.6	10.8	112.5	31.3	--
Nonstocked	54.2	--	--	--	54.2
All types	4,062.0	721.5	2,010.1	1,276.2	54.2
Northwestern Unit:					
Jack pine	319.4	13.4	183.6	122.4	--
Red pine	91.8	14.4	30.6	46.8	--
White pine	45.7	30.6	12.7	2.4	--
Balsam fir-white spruce	298.5	19.7	175.2	103.6	--
Black spruce	94.8	.9	19.4	74.5	--
Northern white-cedar	74.0	21.1	41.5	11.4	--
Tamarack	101.5	1.8	45.5	54.2	--
Oak-hickory	443.5	77.7	258.9	106.9	--
Elm-ash-cottonwood	419.7	83.5	230.4	105.8	--
Maple-beech-birch	1,380.5	319.9	772.5	288.1	--
Aspen	1,604.4	58.1	876.4	669.9	--
Paper birch	240.3	1.5	182.6	56.2	--
Nonstocked	132.3	--	--	--	132.3
All types	5,246.4	642.6	2,829.3	1,642.2	132.3

(Continued on next page)

Table 21 continued

Forest type	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Non-stocked areas
Central Unit:					
Jack pine	255.7	13.3	103.1	139.3	--
Red pine	68.6	7.5	20.1	41.0	--
White pine	59.5	35.6	6.0	17.9	--
Balsam fir-white spruce	14.1	--	8.9	5.2	--
Black spruce	9.0	--	--	9.0	--
Northern white-cedar	11.1	--	8.3	2.8	--
Tamarack	43.6	3.0	4.8	35.8	--
Oak-hickory	861.6	217.9	375.5	268.2	--
Elm-ash-cottonwood	217.5	69.4	70.3	77.8	--
Maple-beech-birch	390.6	175.4	136.4	78.8	--
Aspen	688.4	23.9	326.4	338.1	--
Paper birch	111.1	5.8	40.8	64.5	--
Nonstocked	101.0	--	--	--	101.0
All types	2,831.8	551.8	1,100.6	1,078.4	101.0
Southwestern Unit:					
Jack pine	21.8	--	4.7	17.1	--
Red pine	23.4	--	7.9	15.5	--
White pine	2.6	2.6	--	--	--
Balsam fir-white spruce	--	--	--	--	--
Black spruce	--	--	--	--	--
Northern white-cedar	--	--	--	--	--
Tamarack	--	--	--	--	--
Oak-hickory	867.9	502.6	260.3	105.0	--
Elm-ash-cottonwood	93.7	58.6	13.1	22.0	--
Maple-beech-birch	324.9	219.2	65.7	40.0	--
Aspen	75.0	20.3	24.6	30.1	--
Paper birch	34.7	--	26.3	8.4	--
Nonstocked	49.1	--	--	--	49.1
All types	1,493.1	803.3	402.6	238.1	49.1
Southeastern Unit:					
Jack pine	--	--	--	--	--
Red pine	4.2	--	1.6	2.6	--
White pine	5.7	.7	--	5.0	--
Balsam fir-white spruce	5.4	--	2.7	2.7	--
Black spruce	--	--	--	--	--
Northern white-cedar	50.5	8.5	23.3	18.7	--
Tamarack	8.5	--	5.4	3.1	--
Oak-hickory	279.7	178.8	51.3	49.6	--
Elm-ash-cottonwood	165.3	52.4	66.2	46.7	--
Maple-beech-birch	236.5	132.6	47.0	56.9	--
Aspen	100.8	4.4	36.7	59.7	--
Paper birch	13.8	1.8	2.7	9.3	--
Nonstocked	33.1	--	--	--	33.1
All types	903.5	379.2	236.9	254.3	33.1

Table 22. – Area of commercial forest land, by forest type and stand-age class, Wisconsin, 1968
(Thousand acres)

Forest type	All ages	Stand-age class (years)											
		0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-119	120+
Jack pine	727.6	70.2	131.7	193.6	192.0	94.1	33.2	12.6	0.2	--	--	--	--
Red pine	310.2	85.9	70.4	82.0	25.6	9.1	13.3	13.4	3.0	4.7	2.8	--	--
White pine	177.6	11.3	13.0	12.9	16.8	21.5	17.7	24.8	14.1	18.8	6.4	7.6	12.7
Balsam fir-white spruce	628.0	36.1	71.6	75.3	111.3	178.4	101.8	25.6	14.2	2.3	5.0	4.2	2.2
Black spruce	235.9	4.9	11.5	23.1	51.4	55.5	46.1	24.2	8.5	.7	2.3	6.0	1.7
Northern white-cedar	302.4	1.5	8.9	15.3	21.3	36.4	39.2	50.0	24.6	44.4	10.4	21.6	28.8
Tamarack	222.2	37.7	35.9	17.8	11.3	37.5	35.2	22.5	12.9	3.8	5.9	1.7	--
Oak-hickory	2,664.9	267.8	154.6	136.5	362.3	409.9	316.7	234.9	186.8	182.3	145.7	178.5	88.9
Elm-ash-cottonwood	1,157.6	116.1	78.6	97.1	150.6	130.2	156.7	154.2	74.3	70.2	45.4	56.5	27.7
Maple-beech-birch	3,521.6	179.6	176.7	221.4	434.1	634.1	551.9	300.1	230.0	192.0	163.0	192.5	246.2
Aspen	3,664.6	714.4	585.8	509.4	1,069.4	594.8	136.7	36.9	8.6	4.3	4.3	--	--
Paper birch	554.5	52.4	51.7	72.2	131.2	137.4	80.8	18.7	2.3	6.3	--	1.5	--
Nonstocked	369.7	168.9	38.1	33.5	33.4	23.5	21.3	9.7	22.3	7.5	2.8	8.7	--
All types	14,536.8	1,746.8	1,428.5	1,490.1	2,610.7	2,362.4	1,550.6	927.6	601.8	537.3	394.0	478.8	408.2

Table 23. – Area of commercial forest land, by forest type and area-condition class, Wisconsin, 1968
(Thousand acres)

Forest type	All area conditions	Class 10	Class 20	Class 30	Class 40	Class 50	Class 60	Class 70
Jack pine	727.6	--	0.6	5.1	12.8	138.4	332.5	238.2
Red pine	310.2	--	1.7	20.3	17.4	98.0	128.8	44.0
White pine	177.6	--	.5	3.8	1.1	86.1	50.8	35.3
Balsam fir-white spruce	628.0	6.4	--	28.9	37.7	206.8	249.6	98.6
Black spruce	235.9	--	1.2	2.7	16.3	84.4	98.6	32.7
Northern white-cedar	302.4	--	7.9	17.8	35.6	130.0	84.6	26.5
Tamarack	222.2	--	--	.1	7.6	42.1	110.9	61.5
Oak-hickory	2,664.9	2.8	.3	4.9	12.2	352.7	982.0	1,310.0
Elm-ash-cottonwood	1,157.6	--	.3	4.7	26.1	227.3	429.8	469.4
Maple-beech-birch	3,521.6	7.2	8.4	102.9	167.3	1,091.5	1,411.9	732.4
Aspen	3,664.6	--	7.3	35.7	118.1	743.7	1,605.5	1,154.3
Paper birch	554.5	--	.6	3.0	30.6	143.3	215.4	161.6
Nonstocked	369.7	--	--	--	--	--	--	369.7
All types	14,536.8	16.4	28.8	229.9	482.8	3,344.3	5,700.4	4,734.2

Table 24. – Area of commercial forest land, by forest type and site-index class, Wisconsin, 1968
(Thousand acres)

Forest type	All sites	Site index class (height in feet at 50 years)							
		20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Jack pine	727.6	0.1	32.9	167.8	335.9	163.2	27.7	--	--
Red pine	310.2	--	4.9	6.5	135.6	104.0	51.0	8.2	--
White pine	177.6	--	2.0	45.5	70.2	41.2	17.2	1.5	--
Balsam fir-white spruce	628.0	21.4	78.4	145.6	248.4	102.8	30.6	.8	--
Black spruce	235.9	107.4	85.9	33.0	8.7	.9	--	--	--
Northern white-cedar	302.4	146.5	102.7	37.4	11.8	4.0	--	--	--
Tamarack	222.2	31.6	69.8	64.8	37.5	15.9	2.6	--	--
Oak-hickory	2,664.9	6.6	194.9	642.0	881.0	599.7	260.1	68.4	12.2
Elm-ash-cottonwood	1,157.6	17.7	113.6	291.3	366.0	213.5	103.7	42.0	9.8
Maple-beech-birch	3,521.6	--	52.6	328.5	1,146.4	1,332.0	554.1	101.9	6.1
Aspen	3,664.6	2.0	52.0	301.7	828.6	1,201.0	940.3	285.7	53.3
Paper birch	554.5	1.9	20.4	51.3	165.2	212.7	83.4	19.6	--
Nonstocked	369.7	11.2	75.2	118.7	94.9	54.4	15.3	--	--
All types	14,536.8	346.4	885.3	2,234.1	4,330.2	4,045.3	2,086.0	528.1	81.4

Table 25. – Area of commercial forest land, by stocking class of growing-stock trees and stand-size class, Wisconsin, 1968
(Thousand acres)

Stocking percentage	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
133 or more	521.3	142.0	296.7	82.6	--
100 to 133	2,924.7	754.0	1,618.7	552.0	--
60 to 100	6,037.8	1,209.2	3,034.3	1,794.3	--
17 to 60	4,439.8	973.9	1,572.1	1,893.8	--
Less than 17	613.2	19.3	57.7	166.5	369.7
All classes	14,536.8	3,098.4	6,579.5	4,489.2	369.7

Table 26. – Area of commercial forest land, by forest type and basal area class, Wisconsin, 1968
(Thousand acres)

Forest type	All classes	Basal area class (square feet per acre)									
		0-19	20-39	40-59	60-79	80-99	100-119	120-139	140-159	160-179	180+
Jack pine	727.6	68.7	132.6	204.6	143.9	119.6	33.8	16.7	7.7	--	--
Red pine	310.2	74.4	55.2	46.0	34.7	30.5	30.2	21.0	4.6	8.4	5.2
White pine	177.6	17.2	7.0	33.0	23.4	31.3	23.9	19.1	7.5	11.9	3.3
Balsam fir-white spruce	628.0	58.0	68.6	121.8	113.1	76.4	102.3	55.6	24.5	2.7	5.0
Black spruce	235.9	35.8	50.8	74.6	34.9	22.1	9.1	8.2	.4	--	--
Northern white-cedar	302.4	11.7	14.5	16.8	46.5	37.9	31.4	60.1	26.6	28.4	28.5
Tamarack	222.2	58.6	49.1	49.8	32.9	19.2	5.8	3.4	3.4	--	--
Oak-hickory	2,664.9	121.0	192.6	536.3	627.8	562.4	415.9	144.0	43.9	18.4	2.6
Elm-ash-cottonwood	1,157.6	99.4	153.6	210.5	189.1	179.0	171.6	82.3	31.6	25.7	14.8
Maple-beech-birch	3,521.6	61.7	178.6	453.4	581.4	811.2	781.7	353.6	210.0	59.7	30.3
Aspen	3,664.6	465.3	676.1	911.3	646.6	421.9	320.0	166.1	30.2	19.9	7.2
Paper birch	554.5	46.1	95.8	92.3	99.8	97.3	75.1	41.5	4.2	2.4	--
Nonstocked	369.7	273.4	52.2	30.8	11.2	2.0	.1	--	--	--	--
All types	14,536.8	1,391.3	1,726.7	2,781.2	2,585.3	2,410.8	2,000.9	971.6	394.6	177.5	96.9

Table 27. – Area of commercial forest land, by forest type, stand-size, and site class, Wisconsin, 1968
(Thousand acres)

Forest type and stand-size class	All site classes	165 cu. ft. or more	120 to 165 cu. ft.	85 to 120 cu. ft.	50 to 85 cu. ft.	Less than 50 cu. ft.
White-red-jack pine:						
Sawtimber	207.4	3.5	37.4	58.0	77.4	31.1
Poletimber	476.6	3.5	3.1	46.5	174.4	249.1
Sapling and seedling	531.4	4.8	17.2	86.1	161.2	262.1
All stands	1,215.4	11.8	57.7	190.6	413.0	542.3
Spruce-fir:						
Sawtimber	104.2	--	14.9	21.7	13.1	54.5
Poletimber	655.8	--	24.1	163.9	223.0	244.8
Sapling and seedling	628.5	--	39.1	82.5	168.7	338.2
All stands	1,388.5	--	78.1	268.1	404.8	637.5
Oak-hickory:						
Sawtimber	1,025.8	2.5	--	2.3	224.1	796.9
Poletimber	1,048.8	--	1.1	8.8	265.6	773.3
Sapling and seedling	590.3	--	.2	4.0	64.2	521.9
All stands	2,664.9	2.5	1.3	15.1	553.9	2,092.1
Elm-ash-cottonwood:						
Sawtimber	345.0	--	2.2	6.3	84.7	251.8
Poletimber	491.3	--	.7	15.6	51.9	423.1
Sapling and seedling	321.3	--	6.5	5.2	23.5	286.1
All stands	1,157.6	--	9.4	27.1	160.1	961.0
Maple-beech-birch:						
Sawtimber	1,254.8	--	2.4	70.3	453.4	728.7
Poletimber	1,599.9	1.0	7.4	149.7	590.4	851.4
Sapling and seedling	666.9	--	--	63.2	177.1	426.6
All stands	3,521.6	1.0	9.8	283.2	1,220.9	2,006.7
Aspen-birch:						
Sawtimber	161.2	--	3.5	52.2	81.6	23.9
Poletimber	2,307.1	--	6.6	446.1	1,325.0	529.4
Sapling and seedling	1,750.8	--	--	205.6	960.1	585.1
All stands	4,219.1	--	10.1	703.9	2,366.7	1,138.4
Nonstocked	369.7	--	2.3	1.5	69.7	296.2
All types:						
Sawtimber	3,098.4	6.0	60.4	210.8	934.3	1,886.9
Poletimber	6,579.5	4.5	43.0	830.6	2,630.3	3,071.1
Sapling and seedling	4,489.2	4.8	63.0	446.6	1,554.8	2,420.0
Nonstocked	369.7	--	2.3	1.5	69.7	296.2
All stands	14,536.8	15.3	168.7	1,489.5	5,189.1	7,674.2

Table 28. – Area of commercial forest land, by county and stand-size class, Wisconsin, 1968
(Thousand acres)

County	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
Adams	250.8	40.9	96.5	106.8	6.6
Ashland	526.6	57.6	296.7	159.0	13.3
Barron	152.9	26.8	86.2	35.9	4.0
Bayfield	777.3	64.1	422.6	266.4	24.2
Brown	36.9	18.1	10.3	7.7	.8
Buffalo	165.9	95.5	41.2	24.3	4.9
Burnett	317.3	36.8	175.2	100.2	5.1
Calumet	25.5	9.9	6.8	8.0	.8
Chippewa	211.4	35.1	92.7	75.2	8.4
Clark	276.8	46.4	114.3	106.0	10.1
Columbia	82.1	36.9	20.0	23.1	2.1
Crawford	130.8	67.5	39.0	20.6	3.7
Dane	74.3	36.9	18.1	17.1	2.2
Dodge	42.7	15.2	8.6	14.1	4.8
Door	96.2	31.5	37.6	24.2	2.9
Douglas	610.9	60.6	316.4	221.2	12.7
Dunn	139:0	71.7	36.3	25.6	5.4
Eau Claire	157.5	31.3	67.8	52.2	6.2
Florence	262.7	46.3	135.6	76.8	4.0
Fond du Lac	48.7	17.7	11.9	17.1	2.0
Forest	527.7	81.6	292.1	144.2	9.8
Grant	147.6	76.9	43.1	23.0	4.6
Green	31.3	17.8	6.7	5.9	.9
Green Lake	27.7	14.4	5.3	7.0	1.0
Iowa	120.8	51.9	35.9	27.4	5.6
Iron	373.9	60.0	205.1	102.6	6.2
Jackson	345.5	57.2	141.4	137.7	9.2
Jefferson	32.1	14.6	7.7	8.2	1.6
Juneau	239.6	51.5	94.2	87.2	6.7
Kenosha	9.9	4.8	2.2	2.6	.3
Kewaunee	30.9	12.4	8.8	9.6	.1
La Crosse	94.3	53.9	24.6	13.3	2.5
Lafayette	34.6	19.3	8.6	5.2	1.5
Langlade	382.2	63.3	187.4	127.3	4.2
Lincoln	399.1	59.6	193.2	142.0	4.3
Manitowoc	60.3	27.3	17.8	13.3	1.9
Marathon	373.8	90.3	145.8	127.6	10.1
Marinette	649.9	97.4	307.0	235.7	9.8
Marquette	99.9	23.8	30.8	40.5	4.8
Milwaukee	--	--	--	--	--

(Continued on next page)

Table 28 continued

County	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
Monroe	218.5	54.7	86.3	66.2	11.3
Oconto	357.7	73.3	173.8	103.1	7.5
Oneida	566.6	82.6	275.7	201.7	6.6
Outagamie	69.1	22.2	17.9	25.1	3.9
Ozaukee	14.7	4.6	4.5	4.7	.9
Pepin	44.1	25.7	11.6	5.7	1.1
Pierce	62.6	37.8	13.6	8.5	2.7
Polk	218.0	41.2	117.9	54.5	4.4
Portage	159.5	37.0	56.2	61.2	5.1
Price	608.2	107.0	296.2	184.7	20.3
Racine	14.7	7.2	2.9	4.6	--
Richland	103.2	55.4	26.6	17.1	4.1
Rock	30.7	15.2	5.5	9.3	.7
Rusk	329.1	42.7	182.6	97.2	6.6
St. Croix	49.5	24.4	15.6	7.5	2.0
Sauk	152.1	87.0	37.0	23.6	4.5
Sawyer	621.4	66.2	338.4	199.2	17.6
Shawano[1/]	485.4	142.1	222.4	117.9	3.0
Sheboygan	46.9	15.7	15.4	15.1	.7
Taylor	369.0	40.8	201.9	113.9	12.4
Trempealeau	109.3	58.0	28.6	19.1	3.6
Vernon	139.3	78.3	40.9	17.2	2.9
Vilas	430.7	75.3	222.9	127.5	5.0
Walworth	25.6	12.1	6.8	6.2	.5
Washburn	341.8	38.8	190.1	107.4	5.5
Washington	36.1	18.8	7.4	8.3	1.6
Waukesha	46.4	15.2	10.2	18.3	2.7
Waupaca	164.2	26.6	56.4	71.8	9.4
Waushara	118.3	28.1	39.5	46.0	4.7
Winnebago	20.7	10.7	4.5	4.8	.7
Wood	216.0	28.9	78.7	100.0	8.4
Total	14,536.8	3,098.4	6,579.5	4,489.2	369.7

1/ Shawano county includes Menominee county.

Table 29. — Area of commercial forest land, by county and forest type, Wisconsin, 1968
(Thousand acres)

County	All types	White-red-jack pine	Spruce-fir	Oak-hickory	Elm-ash-cottonwood	Maple-beech-birch	Aspen-birch	Nonstocked
Adams	250.8	85.0	4.5	73.4	10.6	16.9	53.8	6.6
Ashland	526.6	15.9	96.5	18.1	39.9	176.2	166.7	13.3
Barron	152.9	6.6	6.7	20.4	12.4	52.1	50.7	1.0
Bayfield	777.3	128.0	50.1	81.5	40.1	166.9	286.5	24.2
Brown	36.9	.3	3.2	4.4	9.6	15.1	3.5	.8
Buffalo	165.9	2.6	--	93.4	16.1	37.4	11.5	4.9
Burnett	317.3	61.6	13.5	75.6	19.0	38.2	104.3	5.1
Calumet	25.5	.3	1.3	7.1	6.5	6.7	2.8	.8
Chippewa	211.4	11.5	6.1	69.4	16.3	29.2	70.5	8.4
Clark	276.8	11.7	7.6	64.0	21.9	51.6	109.9	10.1
Columbia	82.1	.9	3.7	37.1	11.1	15.1	12.1	2.1
Crawford	130.8	1.6	--	78.4	9.7	25.5	11.9	3.7
Dane	74.3	.6	1.3	50.4	3.5	11.7	4.6	2.2
Dodge	42.7	.5	2.4	8.0	10.8	9.7	6.5	4.8
Door	96.2	.5	19.6	6.0	13.7	32.2	21.3	2.9
Douglas	610.9	95.4	60.7	44.1	40.2	108.2	249.6	12.7
Dunn	139.0	5.3	--	75.2	11.7	32.0	9.4	5.4
Eau Claire	157.5	17.5	2.4	64.2	8.3	16.2	42.7	6.2
Florence	262.7	18.3	33.5	14.1	9.8	97.0	86.0	4.0
Fond du Lac	48.7	1.1	2.7	14.1	11.9	10.1	6.8	2.0
Forest	527.7	27.4	108.4	7.7	16.9	218.3	139.2	9.8
Grant	147.6	2.9	--	90.1	8.4	29.5	12.1	4.6
Green	31.3	.7	.4	18.5	2.4	6.6	1.8	.9
Green Lake	27.7	.2	1.5	11.2	4.3	7.0	2.5	1.0
Iowa	120.8	15.6	--	60.4	7.7	21.8	9.7	5.6
Iron	373.9	4.8	52.8	16.2	42.0	146.5	105.4	6.2
Jackson	345.5	56.1	8.9	119.1	16.1	39.5	96.6	9.2
Jefferson	32.1	.3	2.3	10.2	6.3	7.7	3.7	1.6
Juneau	239.6	49.8	5.3	78.7	20.7	22.0	56.4	6.7
Kenosha	9.9	.3	.4	2.4	1.4	3.9	1.2	.3
Kewaunee	30.9	.3	3.3	4.3	7.3	13.0	2.6	.1
La Crosse	94.3	2.8	--	56.4	9.0	18.1	5.5	2.5
Lafayette	34.6	1.8	--	20.6	1.4	6.4	2.9	1.5
Langlade	382.2	17.9	75.8	16.6	25.2	116.4	126.1	4.2
Lincoln	399.1	16.6	63.6	13.5	24.2	126.6	150.3	4.3
Manitowoc	60.3	.9	5.4	10.9	14.4	19.3	7.5	1.9
Marathon	373.8	17.7	9.2	67.9	35.7	101.7	131.5	10.1
Marinette	649.9	53.1	103.4	57.9	49.6	132.8	243.3	9.8
Marquette	99.9	15.4	3.4	36.7	9.0	9.5	21.1	4.8
Milwaukee	--	--	--	--	--	--	--	--
Monroe	218.5	20.9	1.1	115.9	8.8	24.0	36.5	11.3
Oconto	357.7	41.7	61.5	16.5	39.2	83.3	108.0	7.5
Oneida	566.6	54.2	118.7	30.5	38.5	120.1	198.0	6.6
Outagamie	69.1	.7	4.6	12.0	21.8	17.3	8.8	3.9
Ozaukee	14.7	.1	.6	4.2	2.2	3.2	3.5	.9
Pepin	44.1	.5	--	25.2	4.1	10.1	3.1	1.1
Pierce	62.6	.8	--	38.0	2.2	15.3	3.6	2.7
Polk	218.0	32.5	7.6	63.1	10.5	33.4	66.5	4.4
Portage	159.5	16.5	6.9	45.1	17.4	26.5	42.0	5.1
Price	608.2	23.6	115.4	20.0	63.0	185.7	180.2	20.3
Racine	14.7	.3	.7	3.0	2.5	5.6	2.6	--
Richland	103.2	1.8	--	58.6	4.5	28.7	5.5	4.1
Rock	30.7	.4	.5	17.2	3.3	6.3	2.3	.7
Rusk	329.1	7.0	21.9	20.0	29.4	115.6	128.6	6.6
St. Croix	49.5	2.1	--	27.1	2.1	9.7	6.5	2.0
Sauk	152.1	6.2	--	87.5	9.6	34.5	9.8	4.5
Sawyer	621.4	28.9	78.1	30.7	47.2	167.2	251.7	17.6
Shawano-1/	485.4	37.9	66.5	30.5	39.9	168.9	138.7	3.0
Sheboygan	46.9	.5	4.7	13.1	7.4	13.0	8.5	.7
Taylor	369.0	6.7	45.0	10.2	49.8	124.1	120.8	12.4
Trempealeau	109.3	2.5	--	65.0	5.9	23.7	8.6	3.6
Vernon	139.3	1.3	--	98.0	1.3	32.2	9.6	2.9
Vilas	430.7	49.9	46.1	24.9	18.1	125.7	161.0	5.0
Walworth	25.6	.3	.8	10.2	4.2	7.0	2.6	.5
Washburn	341.8	45.9	20.5	43.6	26.2	66.4	133.7	5.5
Washington	36.1	.2	2.0	8.0	9.4	12.0	2.9	1.6
Waukesha	46.4	.2	2.7	20.9	6.5	8.0	5.4	2.7
Waupaca	164.2	16.3	10.2	38.3	21.4	20.9	47.7	9.4
Waushara	118.3	22.9	3.8	42.5	9.9	11.6	22.9	4.7
Winnebago	20.7	.3	.3	7.5	4.8	6.0	1.1	.7
Wood	216.0	42.5	8.4	46.4	21.4	21.0	67.9	8.4
Total	14,536.8	1,215.4	1,388.5	2,664.9	1,157.6	3,521.6	4,219.1	369.7

1/ Shawano county includes Menominee county.

Table 30. — Area of noncommercial forest land, by ownership class, Wisconsin, 1968
(Thousand acres)

Ownership class	All areas	Productive-reserved areas	Unproductive areas
National Forest	48.5	.6	47.9
Other public	155.0	33.6	121.4
Forest industry	31.9	--	31.9
Farmer and miscellaneous private	173.2	--	173.2
All ownerships	408.6	34.2	374.4

Table 31. – Number of all live trees on commercial forest land, by species and diameter class, Wisconsin, 1968
(Thousand trees)

Species	All classes	Diameter class (inches at breast height)												
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0+
Softwoods:														
White pine	107,269	50,953	22,644	11,820	6,694	4,508	3,514	2,345	1,817	1,261	760	417	447	89
Red pine	147,843	53,565	53,692	24,241	8,748	2,639	1,605	1,545	937	541	214	87	29	--
Jack pine	381,021	160,221	105,898	70,949	30,824	9,634	2,632	727	115	18	3	--	--	--
White spruce	53,573	24,435	14,568	7,565	3,982	1,778	675	353	160	37	12	6	2	--
Black spruce	203,992	111,242	64,897	22,321	4,533	879	74	33	7	5	--	--	--	1
Balsam fir	638,684	360,606	161,661	78,902	27,855	7,556	1,697	329	69	9	--	--	--	--
Hemlock	61,643	20,452	10,589	7,268	7,153	5,727	4,013	2,582	1,774	1,058	486	272	254	15
Tamarack	124,514	56,445	40,345	19,405	6,088	1,468	598	110	47	4	4	--	--	--
Northern white-cedar	282,538	113,999	78,178	48,219	23,524	12,100	4,151	1,578	558	137	60	22	12	--
Other softwoods	4,098	1,657	1,906	249	131	124	17	14	--	--	--	--	--	--
Total softwoods	2,005,175	953,575	554,378	290,939	119,532	46,413	18,976	9,616	5,484	3,070	1,539	804	744	105
Hardwoods:														
White oak	209,972	78,491	48,582	30,778	18,693	12,793	8,838	5,269	3,097	1,678	771	423	463	96
Select red oak	244,141	70,604	50,521	44,190	30,116	19,024	11,046	7,630	4,787	2,752	1,711	859	787	114
Other red oak	268,664	87,281	70,230	48,857	27,424	15,007	9,047	5,005	2,774	1,447	811	377	353	51
Hickory	85,375	47,783	17,749	10,188	4,760	2,907	1,232	542	179	24	11	--	--	--
Yellow birch	132,338	61,969	29,426	17,185	9,985	5,242	3,564	2,101	1,217	760	404	185	256	44
Hard maple	1,215,122	801,979	236,873	94,481	38,193	18,704	9,958	6,172	3,857	2,200	1,316	640	680	69
Soft maple	1,044,271	648,689	246,044	86,596	33,973	15,083	6,746	3,439	1,724	926	513	215	230	93
Beech	17,678	13,195	1,544	890	418	393	405	277	223	158	92	41	42	--
Ash	414,323	225,278	94,506	50,260	24,593	10,942	5,078	2,255	854	287	122	91	51	6
Balsam poplar	14,388	8,227	1,760	1,890	992	683	384	253	93	53	29	21	3	--
Cottonwood	1,884	224	516	234	298	205	150	45	75	35	30	18	31	23
Paper birch	557,833	224,037	161,797	109,338	43,500	13,625	3,996	1,019	306	111	45	36	16	7
Bigtooth aspen	226,112	92,888	47,793	38,325	26,035	12,550	5,228	2,031	885	275	58	36	8	--
Quaking aspen	1,255,443	643,357	278,122	173,571	96,345	43,479	14,643	4,334	1,173	351	59	3	6	--
Basswood	253,868	97,946	62,798	44,572	24,641	12,550	5,499	2,759	1,548	768	348	203	195	41
Butternut	9,354	3,496	1,799	1,076	763	1,075	636	310	96	72	15	12	4	--
Black walnut	2,389	803	327	288	367	245	165	92	58	26	9	7	2	--
Black cherry	132,897	80,454	28,763	13,619	6,451	2,121	935	265	188	69	4	18	10	--
Elm	301,102	151,509	58,863	35,117	22,852	12,573	8,039	5,352	2,961	1,615	924	542	590	165
Other hardwoods	25,591	15,739	4,195	2,355	1,379	640	630	247	198	92	48	29	34	5
Noncommercial species	521,943	453,555	55,127	9,663	2,414	960	198	9	13	4	--	--	--	--
Total hardwoods	6,934,688	3,807,504	1,497,335	813,473	414,192	200,801	96,417	49,406	26,306	13,703	7,320	3,756	3,761	714
All Species	8,939,863	4,761,079	2,051,713	1,104,412	533,724	247,214	115,393	59,022	31,790	16,773	8,859	4,560	4,505	819

Table 32. – Number of growing-stock trees on commercial forest land, by species and diameter class, Wisconsin, 1968
(Thousand trees)

Species	All classes	Diameter class (inches at breast height)												
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0+
Softwoods:														
White pine	93,892	46,545	18,796	9,619	5,297	3,989	3,073	2,167	1,703	1,147	710	386	377	83
Red pine	142,479	50,648	52,139	23,621	8,642	2,558	1,576	1,514	920	535	214	83	29	--
Jack pine	310,800	120,765	88,362	63,317	27,562	7,921	2,239	545	71	18	--	--	--	--
White spruce	50,901	22,337	14,280	7,433	3,937	1,717	655	331	154	37	12	6	2	--
Black spruce	180,550	95,978	58,207	21,228	4,171	847	74	33	7	5	--	--	--	--
Balsam fir	592,892	326,730	153,979	76,273	26,796	7,093	1,653	299	69	--	--	--	--	--
Hemlock	50,918	16,151	8,895	6,023	5,954	4,715	3,429	2,293	1,562	936	456	249	240	15
Tamarack	113,447	50,253	37,208	18,402	5,679	1,321	474	66	40	--	4	--	--	--
Northern white-cedar	233,028	90,854	68,520	40,735	18,792	9,377	3,072	1,159	361	89	44	17	8	--
Other softwoods	3,242	1,470	1,576	131	47	11	7	--	--	--	--	--	--	--
Total softwoods	1,772,149	821,731	501,962	266,782	106,877	39,549	16,252	8,407	4,887	2,767	1,440	741	656	98
Hardwoods:														
White oak	105,241	27,954	28,174	19,125	11,309	7,814	5,000	2,859	1,635	775	294	139	144	19
Select red oak	169,702	34,761	34,884	36,270	24,883	15,657	8,670	6,274	3,887	2,080	1,268	550	464	54
Other red oak	107,964	24,526	30,573	23,234	13,497	7,203	4,143	2,384	1,175	592	343	150	131	13
Hickory	55,537	26,493	13,931	8,050	3,529	2,167	845	365	135	15	7	--	--	--
Yellow birch	80,065	34,728	18,491	11,648	6,701	3,295	2,165	1,145	873	532	227	138	101	21
Hard maple	854,582	524,696	191,709	77,328	29,770	14,040	6,611	4,299	2,804	1,593	896	404	403	29
Soft maple	659,219	362,347	185,797	66,693	24,847	10,611	4,479	2,317	1,024	529	323	115	116	21
Beech	11,652	8,872	1,088	629	182	207	239	130	131	93	37	25	19	--
Ash	302,891	146,926	73,603	43,900	21,710	9,431	4,325	1,873	721	221	85	61	33	2
Balsam poplar	12,604	7,033	1,760	1,646	835	653	278	229	75	45	26	21	3	--
Cottonwood	1,188	--	205	157	298	205	107	38	64	35	28	13	22	16
Paper birch	455,338	165,372	137,389	97,840	38,690	11,841	3,151	729	205	71	25	20	5	--
Bigtooth aspen	187,029	70,152	38,534	35,128	24,355	11,660	4,687	1,669	614	177	32	18	3	--
Quaking aspen	992,012	481,317	222,672	151,030	83,880	37,380	11,632	3,159	768	141	33	--	--	--
Basswood	178,341	47,918	48,440	39,287	22,319	11,217	4,702	2,245	1,203	564	216	140	85	5
Butternut	3,058	584	390	738	292	585	257	145	35	21	8	3	--	--
Black walnut	1,157	220	267	75	271	109	83	61	53	11	4	3	--	--
Black cherry	50,789	24,253	12,741	7,574	4,120	1,286	488	170	98	47	--	7	5	--
Elm	183,625	72,614	39,434	27,492	18,207	10,345	6,448	4,064	2,281	1,185	714	374	383	84
Other hardwoods	8,139	4,897	931	918	557	265	262	96	105	63	23	11	11	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total hardwoods	4,420,133	2,065,663	1,081,013	648,762	330,252	155,971	68,572	34,251	17,886	8,790	4,589	2,192	1,928	264
All Species	6,192,282	2,887,394	1,582,975	915,544	437,129	195,520	84,824	42,658	22,773	11,557	6,029	2,933	2,584	362

Table 33. – Number of growing-stock trees on commercial forest land, by species group, diameter class, and Forest Survey Unit, Wisconsin, 1968
(Thousand trees)

ALL UNITS

Species group	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0+
Softwoods	1,772,149	821,731	501,962	266,782	106,877	39,549	16,252	8,407	4,887	2,767	1,440	741	656	98
Hardwoods	4,420,133	2,065,663	1,081,013	648,762	330,252	155,971	68,572	34,251	17,886	8,790	4,589	2,192	1,928	264
All species	6,192,282	2,887,394	1,582,975	915,544	437,129	195,520	84,824	42,658	22,773	11,557	6,029	2,933	2,584	362
NORTHWESTERN UNIT														
Softwoods	633,573	289,633	169,124	102,141	44,533	16,205	5,755	3,030	1,582	861	361	198	139	11
Hardwoods	1,757,284	808,752	441,403	271,480	137,043	59,447	23,176	9,649	3,718	1,489	643	263	197	24
All species	2,390,857	1,098,385	610,527	373,621	181,576	75,652	28,931	12,679	5,300	2,350	1,004	461	336	35
NORTHEASTERN UNIT														
Softwoods	775,207	358,730	226,780	112,962	42,696	16,573	7,661	3,979	2,530	1,508	825	458	431	74
Hardwoods	1,456,306	719,927	352,723	204,511	100,615	44,859	16,894	8,020	3,932	2,408	1,252	564	541	60
All species	2,231,513	1,078,657	579,503	317,473	143,311	61,432	24,555	11,999	6,462	3,916	2,077	1,022	972	134
CENTRAL UNIT														
Softwoods	263,616	123,478	77,292	38,334	14,668	5,153	2,183	1,138	659	359	211	61	69	11
Hardwoods	731,357	337,168	185,044	108,754	51,895	25,339	11,751	5,796	3,158	1,240	633	322	236	21
All species	994,973	460,646	262,336	147,088	66,563	30,492	13,934	6,934	3,817	1,599	844	383	305	32
SOUTHWESTERN UNIT														
Softwoods	27,680	13,788	9,339	3,309	850	109	125	31	36	27	28	19	17	2
Hardwoods	274,984	100,146	59,369	41,404	27,079	18,070	11,764	7,482	4,752	2,304	1,362	621	544	87
All species	302,664	113,934	68,708	44,713	27,929	18,179	11,889	7,513	4,788	2,331	1,390	640	561	89
SOUTHEASTERN UNIT														
Softwoods	72,073	36,102	19,427	10,036	4,130	1,509	528	229	80	12	15	5	--	--
Hardwoods	200,202	99,670	42,474	22,613	13,620	8,256	4,987	3,304	2,326	1,349	699	422	410	72
All species	272,275	135,772	61,901	32,649	17,750	9,765	5,515	3,533	2,406	1,361	714	427	410	72

Table 34. — Number of short-log trees on commercial forest land, by species and diameter class, Wisconsin, 1968
(Thousand trees)

Species	All classes	Diameter class (inches at breast height)								
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0+
Softwoods:										
White pine	397	128	127	24	25	47	26	6	10	4
Red pine	59	28	13	15	--	--	--	3	--	--
Jack pine	282	182	78	22	--	--	--	--	--	--
White spruce	32	15	10	7	--	--	--	--	--	--
Black spruce	16	16	--	--	--	--	--	--	--	--
Balsam fir	128	88	24	16	--	--	--	--	--	--
Hemlock	269	126	73	32	13	19	4	--	2	--
Tamarack	111	33	71	7	--	--	--	--	--	--
Northern white-cedar	672	443	157	50	14	8	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--
Total softwoods	1,966	1,059	553	173	52	74	30	9	12	4
Hardwoods:										
White oak	3,610	33	1,427	897	527	351	191	86	90	8
Select red oak	2,494	14	913	574	395	255	145	97	97	4
Other red oak	3,313	13	1,368	838	518	330	117	70	51	8
Hickory	250	14	143	77	11	5	--	--	--	--
Yellow birch	718	17	380	182	71	43	4	3	16	2
Hard maple	2,367	51	1,029	558	360	144	108	52	57	8
Soft maple	1,415	12	650	311	242	98	37	22	35	8
Beech	123	--	19	43	19	13	19	4	6	--
Ash	454	--	254	112	35	22	7	14	9	1
Balsam poplar	46	--	29	17	--	--	--	--	--	--
Cottonwood	35	--	15	--	6	--	--	2	7	5
Paper birch	507	14	358	108	17	4	--	6	--	--
Bigtooth aspen	276	--	141	89	36	10	--	--	--	--
Quaking aspen	792	15	553	180	31	9	4	--	--	--
Basswood	735	15	295	207	105	41	39	5	24	4
Butternut	114	--	50	49	10	5	--	--	--	--
Black walnut	62	--	32	19	--	11	--	--	--	--
Black cherry	236	16	140	36	23	11	4	6	--	--
Elm	1,959	29	674	556	280	193	74	49	82	22
Other hardwoods	104	12	49	14	11	8	3	5	2	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--
Total hardwoods	19,610	255	8,519	4,867	2,697	1,553	752	421	476	70
All species	21,576	1,314	9,072	5,040	2,749	1,627	782	430	488	74

Table 35. – Percentage of sawtimber trees on commercial forest land, by butt-log grade and species, Wisconsin, 1968

(In percent)

Species	Percent of trees by butt-log grade			
	Grade 1	Grade 2	Grade 3	Grade 4
Softwoods:				
White pine	5	15	58	22
Red pine	2	17	78	3
Jack pine	--	1	98	1
White spruce	--	5	95	--
Black spruce	--	--	100	--
Balsam fir	--	1	98	1
Hemlock	4	17	78	1
Tamarack	--	1	99	--
Northern white-cedar	--	4	94	2
Other softwoods	--	--	100	--
Total softwoods	2	8	85	5
Hardwoods:				
White oak	7	34	53	6
Select red oak	21	34	42	3
Other red oak	4	20	62	14
Hickory	3	17	77	3
Yellow birch	10	32	53	5
Hard maple	12	35	47	6
Soft maple	8	33	55	4
Beech	6	39	44	11
Ash	15	40	44	1
Balsam poplar	6	39	55	--
Cottonwood	24	10	49	17
Paper birch	1	22	71	6
Bigtooth aspen	4	30	64	2
Quaking aspen	1	15	78	6
Basswood	15	40	43	2
Butternut	--	46	39	15
Black walnut	11	55	34	--
Black cherry	4	39	57	--
Elm	13	40	42	3
Other hardwoods	9	16	65	10
Noncommercial species	--	--	--	--
Total hardwoods	10	32	53	5
All species	8	24	63	5

Table 36. – Net volume of timber on commercial forest land, by class of timber and softwoods and hardwoods, Wisconsin, 1968

(Million cubic feet)

Class of timber	All species	Softwoods	Hardwoods
Sawtimber trees:			
Saw-log portion	3,631.4	1,039.1	2,592.3
Upper-stem portion	810.9	219.1	591.8
Total sawtimber	4,442.3	1,258.2	3,184.1
Poletimber trees	6,553.8	1,216.5	5,337.3
Total growing stock	10,996.1	2,474.7	8,521.4
Rough cull trees:			
Sawtimber	149.6	16.1	133.5
Poletimber	289.5	24.4	265.1
Total rough cull	439.1	40.5	398.6
Short-log cull trees:			
Sawtimber	383.9	19.9	364.0
Poletimber	--	--	--
Total short-log	383.9	19.9	364.0
Rotten cull trees:			
Sawtimber	163.1	18.4	144.7
Poletimber	97.7	6.3	91.4
Total rotten cull	260.8	24.7	236.1
Total cull	1,083.8	85.1	998.7
Salvable dead trees:			
Sawtimber	24.9	7.4	17.5
Poletimber	28.7	5.9	22.8
Total salvable dead	53.6	13.3	40.3
All classes	12,133.5	2,573.1	9,560.4

Table 37. – Net volume of growing stock and sawtimber on commercial forest land, by ownership class and softwoods and hardwoods, Wisconsin, 1968

Ownership class	Growing stock			Sawtimber		
	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods
	Million cubic feet			Million board feet[1/]		
National Forest	1,095.0	352.2	742.8	1,575.2	772.6	802.6
Other public	2,192.4	581.2	1,611.2	3,374.5	1,396.5	1,978.0
Forest industry	1,256.6	436.8	819.8	3,077.6	1,402.6	1,675.0
Farmer and miscellaneous private	6,452.1	1,104.5	5,347.6	13,728.4	2,925.4	10,803.0
All ownerships	10,966.1	2,474.7	8,521.4	21,755.7	6,497.1	15,258.6

1/ International 1/4-inch rule.

Table 38. – Net volume of growing stock on commercial forest land, by species and diameter class, Wisconsin, 1968
(Million cubic feet)

Species	All classes	Diameter class (inches at breast height)											
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0+
Softwoods:												
White pine	412.7	24.4	26.9	36.4	45.5	47.0	52.7	49.4	38.9	29.9	42.8	18.8
Red pine	241.1	47.6	38.8	23.5	24.6	34.4	30.2	22.6	11.5	5.4	2.5	--
Jack pine	417.6	161.5	141.1	70.9	31.0	10.5	2.0	.6	--	--	--	--
White spruce	81.7	17.1	21.2	17.0	10.0	7.8	5.3	1.9	.8	.4	.2	--
Black spruce	92.0	57.9	23.1	8.6	1.2	.6	.3	.3	--	--	--	--
Balsam fir	439.0	200.0	139.5	65.8	25.1	6.4	2.2	--	--	--	--	--
Hemlock	336.2	14.9	28.3	38.9	47.0	47.9	46.6	38.8	26.2	18.9	25.5	3.2
Tamarack	111.1	54.0	33.0	13.7	7.4	1.5	1.3	--	.2	--	--	--
Northern white-cedar	342.4	98.2	88.3	79.2	38.0	21.8	9.6	3.3	2.2	1.1	.7	--
Other softwoods	.9	.4	.3	.1	.1	--	--	--	--	--	--	--
Total softwoods	2,474.7	676.0	540.5	354.1	229.9	177.9	150.2	116.9	79.8	55.7	71.7	22.0
Hardwoods:												
White oak	406.1	47.7	57.6	69.0	70.2	57.1	44.6	27.0	13.5	7.5	10.0	1.9
Select red oak	992.8	112.7	142.8	146.1	128.1	131.5	112.5	78.8	60.9	33.2	38.6	7.6
Other red oak	367.6	61.7	65.6	59.7	53.7	44.5	29.3	19.8	14.6	7.9	9.1	1.7
Hickory	107.4	32.6	25.4	25.1	13.0	7.3	3.4	.3	.3	--	--	--
Yellow birch	219.6	29.5	33.8	26.8	30.4	23.5	25.3	19.5	11.2	8.3	8.3	3.0
Hard maple	938.4	207.7	160.9	127.0	93.8	89.4	80.6	62.9	47.4	27.1	37.1	4.5
Soft maple	646.7	195.0	140.3	101.8	68.2	51.2	31.4	21.6	16.3	7.4	10.3	3.2
Beech	25.8	2.9	1.2	2.2	3.7	3.0	4.0	3.6	1.9	1.6	1.7	--
Ash	505.6	138.9	124.5	91.8	65.4	41.1	22.1	9.1	4.9	4.1	3.2	.5
Balsam poplar	32.6	5.9	5.1	6.2	4.0	4.6	2.0	1.8	1.2	1.4	.4	--
Cottonwood	19.5	.6	1.3	2.0	1.6	.9	2.0	1.4	1.5	.8	2.7	4.7
Paper birch	727.5	300.0	232.8	118.0	49.4	16.2	5.9	2.7	1.3	.9	.3	--
Bigtooth aspen	519.2	102.1	148.6	121.3	78.9	39.7	19.3	6.6	1.5	1.0	.2	--
Quaking aspen	1,640.3	458.7	510.9	384.0	186.6	70.9	22.7	5.1	1.4	--	--	--
Basswood	559.6	107.3	129.3	109.9	75.2	50.5	36.7	22.0	11.1	8.7	8.3	.6
Butternut	18.3	2.5	1.4	5.2	3.7	3.1	1.1	.7	.4	.2	--	--
Black walnut	7.5	.2	1.4	1.0	1.2	1.3	1.5	.5	.2	.2	--	--
Black cherry	69.6	21.3	21.3	11.4	6.8	3.4	2.8	1.9	--	.3	.4	--
Elm	695.4	87.6	103.8	97.9	94.3	85.6	66.0	48.2	36.8	24.8	35.9	14.5
Other hardwoods	21.9	2.5	3.1	2.4	3.9	2.1	3.0	2.3	1.1	.7	.8	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--	--	--
Total hardwoods	8,521.4	1,917.4	1,911.1	1,508.8	1,032.1	726.9	516.2	335.8	227.5	136.1	167.3	42.2
All species	10,996.1	2,593.4	2,451.6	1,862.9	1,262.0	904.8	666.4	452.7	307.3	191.8	239.0	64.2

Table 39. – Net volume of sawtimber on commercial forest land, by species and diameter class, Wisconsin, 1968
(Million board feet)[1]

Species	All classes	Diameter class (inches at breast height)								
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0+
Softwoods:										
White pine	1,944.6	194.8	238.3	250.3	276.8	264.6	205.1	162.0	240.2	112.5
Red pine	843.9	127.4	131.9	182.9	164.3	123.4	66.0	32.5	15.5	--
Jack pine	561.3	345.8	151.9	51.0	9.8	2.8	--	--	--	--
White spruce	203.9	79.9	46.1	36.7	24.1	9.2	4.5	2.2	1.2	--
Black spruce	50.5	39.5	5.4	3.2	1.2	1.2	--	--	--	--
Balsam fir	460.6	308.2	112.9	29.1	10.4	--	--	--	--	--
Hemlock	1,583.8	206.8	243.9	251.7	250.1	209.4	144.5	106.5	150.1	20.8
Tamarack	117.1	66.7	35.8	7.6	6.4	--	.6	--	--	--
Northern white-cedar	730.4	372.9	181.5	97.0	45.3	15.8	10.4	4.6	2.9	--
Other softwoods	1.0	.5	.5	--	--	--	--	--	--	--
Total softwoods	6,497.1	1,742.5	1,148.2	909.5	788.4	626.4	431.1	307.8	409.9	133.3
Hardwoods:										
White oak	1,091.8	--	375.0	269.6	198.0	115.3	54.3	30.6	40.6	8.4
Select red oak	2,889.2	--	689.8	666.2	545.7	368.2	272.6	147.5	165.8	33.4
Other red oak	825.0	--	272.6	205.1	127.0	82.9	62.1	33.1	35.6	6.6
Hickory	107.3	--	57.2	31.0	16.0	2.0	1.1	--	--	--
Yellow birch	642.0	--	159.9	114.6	122.0	90.6	55.2	42.0	42.3	15.4
Hard maple	2,119.4	--	458.5	426.1	372.6	296.8	230.5	131.0	180.4	23.5
Soft maple	980.2	--	336.5	239.4	144.5	99.3	69.6	32.0	43.2	15.7
Beech	87.0	--	16.1	13.6	18.7	16.9	8.2	6.3	7.2	--
Ash	765.7	--	339.7	213.9	109.5	45.2	22.7	17.5	13.8	3.4
Balsam poplar	80.6	--	23.3	25.8	10.6	9.1	5.4	5.4	1.0	--
Cottonwood	65.8	--	7.7	4.8	9.8	6.6	6.5	3.1	11.4	15.9
Paper birch	376.4	--	237.2	80.5	29.3	14.3	6.6	6.1	2.4	--
Bigtooth aspen	740.8	--	379.9	202.8	105.4	39.3	8.8	4.2	.4	--
Quaking aspen	1,368.5	--	869.2	342.2	118.4	30.4	8.3	--	--	--
Basswood	1,005.8	--	363.0	240.2	172.4	100.8	48.4	38.9	39.0	3.1
Butternut	43.9	--	18.4	14.9	4.8	3.6	1.5	.7	--	--
Black walnut	22.5	--	5.9	6.7	6.8	1.8	1.0	.3	--	--
Black cherry	72.0	--	32.8	14.6	13.4	8.5	--	1.2	1.5	--
Elm	1,906.6	--	455.3	408.3	316.8	229.5	169.4	112.9	159.6	54.8
Other hardwoods	68.1	--	19.2	10.5	14.8	10.2	5.8	3.2	4.4	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--
Total hardwoods	15,258.6	--	5,117.2	3,530.8	2,456.5	1,571.3	1,038.0	616.0	748.6	180.2
All Species	21,755.7	1,742.5	6,265.4	4,440.3	3,244.9	2,197.7	1,469.1	923.8	1,158.5	313.5

1/ International 1/4-inch rule.

Table 40. – Net volume of growing stock on commercial forest land, by species and Forest Survey Unit, Wisconsin, 1968
(Million cubic feet)

Species	All units	Northeastern unit	Northwestern unit	Central unit	Southeastern unit	Southwestern unit
Softwoods:						
White pine	412.7	200.0	107.3	92.2	4.4	8.8
Red pine	241.1	118.6	80.0	32.8	2.3	7.4
Jack pine	417.6	101.1	188.2	122.5	.8	5.0
White spruce	81.7	46.8	33.4	.6	.9	--
Black spruce	92.0	62.5	27.9	1.5	.1	--
Balsam fir	439.0	204.5	223.6	9.2	1.7	--
Hemlock	336.2	229.4	77.9	24.7	4.2	--
Tamarack	111.1	25.5	63.9	14.7	6.9	.1
Northern white-cedar	342.4	159.8	108.9	22.0	51.7	--
Other softwoods	.9	--	--	.6	.1	.2
Total softwoods	2,474.7	1,148.2	911.1	320.8	73.1	21.5
Hardwoods:						
White oak	406.1	10.9	51.5	106.3	75.9	161.5
Select red oak	992.8	143.3	227.5	238.7	75.3	308.0
Other red oak	367.6	40.5	39.1	131.8	34.0	122.2
Hickory	107.4	4.6	2.5	8.6	28.1	63.6
Yellow birch	219.6	97.1	94.8	22.7	4.0	1.0
Hard maple	938.4	374.3	376.7	75.3	46.7	65.4
Soft maple	646.7	165.6	241.0	139.8	34.5	65.8
Beech	25.8	13.1	--	.5	12.2	--
Ash	505.6	127.0	220.5	61.6	64.7	31.8
Balsam poplar	32.6	21.7	6.4	.1	4.1	.3
Cottonwood	19.5	4.4	.1	--	5.2	9.8
Paper birch	727.5	272.8	326.8	66.5	17.5	43.9
Bigtooth aspen	519.2	148.6	198.9	88.3	13.4	70.0
Quaking aspen	1,640.3	536.7	780.6	215.7	41.2	66.1
Basswood	559.6	185.2	241.3	50.9	20.0	62.2
Butternut	18.3	3.5	3.1	2.8	1.0	7.9
Black walnut	7.5	--	--	.2	2.4	4.9
Black cherry	69.6	21.0	11.7	7.6	16.2	13.1
Elm	695.4	212.0	164.2	101.1	105.6	112.5
Other hardwoods	21.9	2.3	.3	3.0	7.7	8.6
Noncommercial species	--	--	--	--	--	--
Total hardwoods	8,521.4	2,384.6	2,987.0	1,321.5	609.7	1,218.6
All Species	10,996.1	3,532.8	3,898.1	1,642.3	682.8	1,240.1

Table 41. — Net volume of sawtimber on commercial forest land, by species and Forest Survey Unit, Wisconsin, 1968
(Million board feet)[1]

Species	All units	Northeastern unit	Northwestern unit	Central unit	Southeastern unit	Southwestern unit
Softwoods:						
White pine	1,944.6	949.2	532.3	417.0	17.0	29.1
Red pine	843.9	469.6	261.6	105.1	1.8	5.8
Jack pine	561.3	184.6	205.0	161.4	3.3	7.0
White spruce	203.9	100.5	100.9	1.6	.9	--
Black spruce	50.5	35.3	13.7	1.5	--	--
Balsam fir	460.6	183.4	270.0	4.6	2.6	--
Hemlock	1,583.8	1,109.4	379.6	82.3	12.5	--
Tamarack	117.1	23.1	71.9	12.8	9.3	--
Northern white-cedar	730.4	299.8	322.4	23.5	84.7	--
Other softwoods	1.0	--	--	1.0	--	--
Total softwoods	6,497.1	3,354.9	2,157.4	810.8	132.1	41.9
Hardwoods:						
White oak	1,091.8	22.3	82.6	255.6	277.9	453.4
Select red oak	2,889.2	318.5	369.2	699.2	290.0	1,212.3
Other red oak	825.0	69.8	65.5	218.6	107.7	363.4
Hickory	107.3	7.6	2.2	11.6	35.6	50.3
Yellow birch	642.0	329.5	263.2	40.5	6.2	2.6
Hard maple	2,119.4	1,040.1	546.2	203.1	125.2	204.8
Soft maple	980.2	228.2	278.7	223.1	83.0	167.2
Beech	87.0	48.1	--	1.7	37.2	--
Ash	765.7	192.2	301.4	93.7	105.4	73.0
Balsam poplar	80.6	52.6	15.3	--	12.7	--
Cottonwood	65.8	14.5	--	--	17.7	33.6
Paper birch	376.4	143.3	130.2	23.7	24.3	54.9
Bigtooth aspen	740.8	166.7	270.4	96.8	24.2	182.7
Quaking aspen	1,368.5	418.3	756.5	116.8	24.3	52.6
Basswood	1,005.8	281.6	363.7	127.3	62.3	170.9
Butternut	43.9	9.4	6.6	8.2	1.4	18.3
Black walnut	22.5	--	--	1.0	8.4	13.1
Black cherry	72.0	15.9	.8	5.5	35.8	14.0
Elm	1,906.6	579.2	412.5	299.1	327.4	288.4
Other hardwoods	68.1	9.0	.7	12.8	22.3	23.3
Noncommercial species	--	--	--	--	--	--
Total hardwoods	15,258.6	3,946.8	3,865.7	2,438.3	1,629.0	3,378.8
All species	21,755.7	7,301.7	6,023.1	3,249.1	1,761.1	3,420.7

1/ International 1/4-inch rule.

Table 42. — Net volume of growing stock on commercial forest land, by species and forest type, Wisconsin, 1968
(Million cubic feet)

Species	All forest types	Forest types												
		Jack pine	Red pine	White pine	Balsam fir-white spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-cottonwood	Maple-beech-birch	Aspen	Paper birch	Nonstocked
Softwoods:														
White pine	412.7	6.9	22.8	148.5	13.4	3.8	2.9	5.2	35.2	18.6	103.3	43.5	8.5	0.1
Red pine	241.1	14.9	121.9	19.8	4.1	4.1	.2	.7	16.3	1.0	13.2	37.8	7.1	--
Jack pine	417.6	306.8	9.9	4.3	.3	.7	--	.2	46.3	1.3	1.2	43.1	3.3	.2
White spruce	81.7	--	1.2	2.6	34.2	1.0	2.8	1.0	--	7.6	11.1	17.5	2.4	.3
Black spruce	92.0	1.9	1.2	1.8	17.6	36.9	9.9	10.1	--	2.3	1.7	7.8	.8	--
Balsam fir	439.0	.2	3.1	5.5	190.3	8.8	32.6	6.1	--	33.0	77.5	64.6	17.2	.1
Hemlock	336.2	--	.5	2.1	11.1	1.1	8.8	.2	.3	16.5	291.1	2.2	2.3	--
Tamarack	111.1	--	.4	1.3	5.0	8.2	8.7	60.1	1.2	8.2	2.1	13.7	1.8	.4
Northern white-cedar	342.4	--	.3	3.0	36.2	1.0	179.4	2.1	--	52.2	54.0	10.5	3.7	--
Other softwoods	.9	.2	.4	--	--	--	--	--	--	--	.2	.1	--	--
Total softwoods	2,474.7	330.9	161.7	188.9	312.2	65.6	245.3	85.7	99.3	140.7	555.4	240.8	47.1	1.1
Hardwoods:														
White oak	406.1	0.5	--	1.3	0.3	--	0.3	--	315.5	15.2	48.2	21.2	3.4	0.2
Select red oak	992.8	3.7	3.1	3.9	.6	0.4	--	0.2	695.0	10.8	181.0	70.7	23.1	.3
Other red oak	367.6	8.3	1.6	1.8	--	--	--	--	321.7	1.6	12.7	17.2	1.8	.9
Hickory	107.4	--	--	--	--	--	.2	--	76.5	.7	27.4	1.9	.6	.1
Yellow birch	219.6	--	--	--	9.3	.2	3.2	.2	.6	18.4	183.0	3.3	1.4	--
Hard maple	938.4	--	.3	1.1	4.7	.2	.3	--	26.3	12.2	868.8	16.5	7.7	.3
Soft maple	646.7	--	.5	7.0	16.0	.6	3.3	.5	61.4	167.3	305.8	65.1	19.2	--
Beech	25.8	--	--	--	--	--	--	--	--	1.0	24.8	--	--	--
Ash	505.6	--	--	.9	10.5	--	10.5	--	20.1	240.9	191.2	26.3	4.3	.9
Balsam poplar	32.6	--	--	--	1.9	--	.4	.4	.5	5.6	3.7	18.3	1.8	--
Cottonwood	19.5	--	--	.2	--	--	--	--	2.7	11.3	2.4	2.4	.5	--
Paper birch	727.5	1.8	3.5	5.5	26.3	2.5	10.3	3.5	74.7	34.0	164.9	177.1	223.4	--
Bigtooth aspen	519.2	4.8	2.0	2.1	2.8	.8	--	--	119.8	8.0	51.3	313.1	14.5	--
Quaking aspen	1,640.3	14.0	14.2	13.6	48.8	8.1	5.3	2.2	81.8	46.7	192.3	1,167.6	44.4	1.3
Basswood	559.6	--	--	.7	1.6	--	1.2	--	35.2	24.8	476.1	17.1	2.9	--
Butternut	18.3	--	--	--	--	--	--	--	6.6	.2	10.2	1.2	.1	--
Black walnut	7.5	--	--	--	--	--	--	--	5.3	--	2.2	--	--	--
Black cherry	69.6	--	--	--	2.1	--	--	.3	28.5	1.9	25.1	11.2	.4	.1
Elm	695.4	.2	--	1.4	4.9	--	5.9	.5	45.2	201.8	399.5	30.4	3.8	1.8
Other hardwoods	21.9	--	.6	--	--	--	.1	--	3.0	10.7	4.0	3.4	.1	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total hardwoods	8,521.4	33.3	25.8	39.5	129.8	12.8	41.0	7.8	1,920.4	813.1	3,174.6	1,964.0	353.4	5.9
All species	10,996.1	364.2	187.5	228.4	442.0	78.4	286.3	93.5	2,019.7	953.8	3,730.0	2,204.8	400.5	7.0

Table 43. – Net volume of sawtimber on commercial forest land, by species and forest type, Wisconsin, 1968
(Million board feet)[1]

Species	All forest types	Forest types												
		Jack pine	Red pine	White pine	Balsam fir–white spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-cottonwood	Maple-beech-birch	Aspen	Paper birch	Nonstocked
Softwoods:														
White pine	1,944.6	28.4	92.6	707.8	71.1	19.3	12.5	23.6	161.0	91.2	509.5	192.1	34.8	0.7
Red pine	843.9	46.0	316.4	91.3	20.1	21.4	1.0	3.8	83.2	4.6	67.1	154.7	34.3	--
Jack pine	561.3	331.7	20.0	15.3	1.3	2.5	--	--	92.4	4.1	3.9	79.9	10.2	--
White spruce	203.9	--	1.2	10.5	67.1	4.0	9.5	1.1	--	23.7	40.1	40.0	5.1	1.6
Black spruce	50.5	.7	--	2.3	12.5	9.3	5.2	7.1	--	5.4	4.3	3.7	--	--
Balsam fir	460.6	--	4.5	12.0	186.0	12.1	10.9	1.4	--	30.3	139.2	47.3	16.9	--
Hemlock	1,583.8	--	--	7.3	47.3	4.5	43.1	1.3	1.0	55.1	1,410.3	5.8	8.1	--
Tamarack	117.1	--	.8	.7	1.6	5.3	9.9	52.6	3.7	22.8	--	16.3	2.6	.8
Northern white-cedar	730.4	--	1.2	10.9	84.6	2.7	331.6	2.4	--	107.8	172.6	10.3	6.3	--
Other softwoods	1.0	--	1.0	--	--	--	--	--	--	--	--	--	--	--
Total softwoods	6,497.1	406.8	437.7	858.1	491.6	81.1	423.7	93.3	341.3	345.0	2,347.0	550.1	118.3	3.1
Hardwoods:														
White oak	1,091.8	--	--	4.4	--	--	0.6	--	855.2	49.4	144.6	27.1	9.3	1.2
Select red oak	2,889.2	6.4	3.0	11.9	1.2	--	--	--	2,092.3	31.8	578.2	108.0	55.0	1.4
Other red oak	825.0	9.8	2.4	2.7	--	--	--	--	733.3	3.2	35.3	32.3	4.0	2.0
Hickory	107.3	--	--	--	--	--	.4	--	72.6	1.1	30.8	1.9	.5	--
Yellow birch	642.0	--	--	--	33.9	0.6	7.1	0.9	1.3	40.9	547.9	7.0	2.4	--
Hard maple	2,119.4	--	.8	2.4	8.4	.9	--	--	57.8	21.7	2,003.5	13.4	9.8	.7
Soft maple	980.2	--	--	17.4	27.3	.7	6.6	.6	69.5	383.7	440.3	23.2	10.9	--
Beech	87.0	--	--	--	--	--	--	--	--	1.3	85.7	--	--	--
Ash	765.7	--	--	1.6	10.9	--	7.3	--	25.5	360.7	344.5	10.8	3.4	1.0
Balsam poplar	80.6	--	--	--	2.8	--	2.1	--	.9	23.2	12.8	34.0	4.8	--
Cottonwood	65.8	--	--	1.0	--	--	--	--	8.8	39.1	8.3	6.7	1.9	--
Paper birch	376.4	--	3.4	5.4	10.1	--	9.1	.9	43.8	31.6	146.8	46.9	78.4	--
Bigtooth aspen	740.8	3.9	1.1	3.6	7.1	.9	--	--	247.5	15.2	108.1	328.8	24.6	--
Quaking aspen	1,368.5	8.0	15.6	20.5	48.8	5.5	7.3	--	60.7	71.4	296.9	778.9	53.4	1.5
Basswood	1,005.8	--	--	2.9	3.0	--	3.3	--	69.7	54.5	855.9	13.4	3.1	--
Butternut	43.9	--	--	--	--	--	--	--	15.7	.7	25.2	2.3	--	--
Black walnut	22.5	--	--	--	--	--	--	--	15.5	--	7.0	--	--	--
Black cherry	72.0	--	--	--	1.0	--	--	--	41.4	2.6	22.1	4.9	--	--
Elm	1,906.6	--	--	2.9	11.6	--	15.2	.3	106.2	596.0	1,122.9	40.8	6.6	4.1
Other hardwoods	68.1	--	2.9	--	--	--	.7	--	3.5	40.1	13.2	7.1	.6	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total hardwoods	15,258.6	28.1	29.2	76.7	166.1	8.6	59.7	2.7	4,521.2	1,768.2	6,830.0	1,487.5	268.7	11.9
All species	21,755.7	434.9	466.9	934.8	657.7	89.7	483.4	96.0	4,862.5	2,113.2	9,177.0	2,037.6	387.0	15.0

1/ International 1/4-inch rule.

Table 44. -- Net volume of growing stock on commercial forest land by county and species group, Wisconsin, 1968
(Thousand cubic feet)

County	All species	Softwoods	Oak	Yellow birch	Hard maple	Ash	Aspen	Elm	Other hardwoods
Adams	127,142	37,896	39,705	893	3,112	3,033	21,757	4,922	15,824
Ashland	422,105	109,376	22,112	13,620	50,947	25,217	88,590	16,851	95,392
Barron	122,379	18,668	14,512	2,947	13,414	6,944	31,545	6,249	28,100
Bayfield	572,308	151,791	52,006	13,169	52,211	25,525	139,459	16,906	121,241
Brown	32,777	3,950	4,424	284	3,049	3,840	2,149	7,410	7,671
Buffalo	143,148	1,880	66,794	111	8,074	4,148	13,778	13,809	34,554
Burnett	211,104	52,851	34,618	2,283	10,120	8,801	60,782	7,047	34,602
Calumet	18,446	1,793	4,945	126	1,288	2,015	1,248	2,844	4,187
Chippewa	122,861	20,090	35,558	1,659	5,467	4,361	27,334	7,070	21,322
Clark	163,103	26,781	38,544	2,836	9,211	6,502	37,691	11,004	30,534
Columbia	60,285	4,116	24,016	237	3,034	4,424	5,198	6,525	12,735
Crawford	107,930	1,130	50,947	95	4,945	2,836	13,027	9,686	25,264
Dane	57,394	1,793	29,301	150	2,876	2,844	3,500	4,748	12,182
Dodge	24,103	2,022	5,767	134	1,722	2,639	1,936	4,440	5,443
Door	85,265	20,248	7,244	616	6,359	8,137	11,400	14,647	16,614
Douglas	384,311	107,076	26,797	6,020	24,553	17,941	117,441	14,394	70,089
Dunn	111,050	1,943	50,536	95	6,170	3,239	11,605	10,831	26,631
Eau Claire	90,479	16,519	31,466	798	2,899	2,520	18,478	4,092	13,707
Florence	233,903	61,280	5,980	20,169	41,420	2,931	55,134	15,089	31,900
Fond du Lac	30,210	3,350	8,571	158	1,588	3,176	2,449	4,266	6,652
Forest	448,965	145,265	4,195	17,262	76,164	10,468	76,132	28,874	90,605
Grant	120,293	1,667	58,247	103	5,601	2,970	13,754	10,586	27,365
Green	25,801	1,251	12,047	87	1,398	1,580	1,319	2,686	5,333
Green Lake	20,643	1,485	7,260	95	1,462	1,533	1,422	2,828	4,558
Iowa	90,645	5,017	40,519	63	3,982	2,315	10,080	8,050	20,619
Iron	290,443	57,685	19,118	7,963	34,578	20,374	63,777	17,159	69,789
Jackson	183,770	38,497	58,436	1,849	6,826	5,040	36,434	8,595	28,093
Jefferson	23,787	2,275	7,466	134	1,635	2,220	1,398	3,595	5,064
Juneau	139,380	31,355	44,090	1,406	4,337	5,285	23,139	7,916	21,852
Kenosha	7,821	537	1,833	47	830	743	474	1,485	1,872
Kewaunee	26,512	3,729	3,547	205	2,528	3,168	2,077	5,467	5,791
La Crosse	81,804	1,130	38,907	55	3,705	2,291	8,303	7,853	19,560
Lafayette	28,851	632	14,354	24	1,390	703	3,105	2,481	6,162
Langlade	287,078	62,916	4,921	7,379	49,841	9,132	58,152	24,909	69,828
Lincoln	307,057	53,024	13,359	5,870	34,239	22,231	73,019	25,501	79,814
Manitowoc	51,239	5,980	8,856	395	4,211	5,957	3,602	10,467	11,771

(Continued on next page)

Table 44 continued

County	All species	Softwoods	Oak	Yellow birch	Hard maple	Ash	Aspen	Elm	Other hardwoods
Marathon	272,463	41,806	55,774	6,826	22,199	13,312	51,832	24,166	56,548
Marinette	485,826	127,150	57,078	2,512	22,215	24,419	119,677	25,075	107,700
Marquette	53,617	10,443	19,640	427	1,390	2,022	7,979	3,065	8,651
Milwaukee	--	--	--	--	--	--	--	--	--
Monroe	127,972	21,093	54,984	1,066	4,361	3,192	18,533	5,617	19,126
Oconto	330,378	159,106	8,761	3,002	10,476	17,119	59,132	24,869	47,913
Oneida	482,240	209,129	30,794	6,620	15,318	9,275	111,532	4,851	94,721
Outagamie	45,780	5,538	8,129	348	3,128	5,980	3,871	8,279	10,507
Ozaukee	9,472	916	2,275	55	592	822	1,359	1,288	2,165
Pepin	39,982	411	18,178	24	2,101	1,145	4,708	3,816	9,599
Pierce	53,175	553	26,876	47	3,350	1,224	5,475	4,661	10,989
Polk	161,484	32,793	33,686	2,149	9,599	6,138	43,442	5,972	27,705
Portage	100,022	18,794	27,919	1,683	5,451	4,535	15,215	7,576	18,849
Price	499,809	134,355	27,697	14,970	53,886	34,484	101,578	24,269	108,570
Racine	12,506	933	2,465	87	1,098	1,311	1,043	2,496	3,073
Richland	84,024	1,438	40,100	79	5,388	2,125	8,177	8,105	18,612
Rock	22,831	727	10,609	79	1,359	1,501	1,359	2,323	4,874
Rusk	244,292	36,680	19,308	5,783	27,002	15,413	68,801	13,130	58,175
St. Croix	41,649	853	18,549	24	2,046	1,003	7,742	3,223	8,209
Sauk	128,723	2,165	62,600	103	7,189	3,207	13,651	11,621	28,187
Sawyer	470,745	105,528	30,075	11,574	45,085	25,960	130,816	18,691	103,016
Shawano[1/]	576,241	194,483	45,844	22,522	82,783	29,885	44,517	57,962	98,245
Sheboygan	34,270	4,305	8,248	205	2,315	3,523	3,326	4,930	7,418
Taylor	280,237	51,832	13,572	10,681	39,050	21,701	58,626	14,054	70,721
Trempealeau	89,104	1,351	43,023	79	4,685	2,244	9,440	8,011	20,271
Vernon	119,724	1,304	62,236	95	6,794	2,370	13,193	9,756	23,976
Vilas	380,827	135,825	23,708	11,723	41,814	1,493	88,014	4,993	73,257
Walworth	19,940	1,249	6,675	103	1,406	1,825	1,296	2,962	4,424
Washburn	238,896	52,424	24,601	3,658	16,282	11,992	74,615	9,504	45,820
Washington	30,684	2,891	6,233	253	2,504	3,642	1,375	6,407	7,379
Waukesha	27,050	3,073	10,135	111	980	2,228	2,236	2,812	5,475
Waupaca	88,259	18,004	21,425	1,327	3,895	4,764	15,026	6,668	17,150
Waushara	66,076	13,762	23,755	679	2,228	2,386	9,259	3,713	10,294
Winnebago	15,950	790	5,174	87	1,304	1,556	553	2,662	3,824
Wood	107,132	25,739	25,580	1,287	3,887	4,621	21,362	6,660	17,996
State total	10,995,772	2,474,541	1,766,704	219,605	938,346	505,500	2,159,448	695,469	2,236,159

1/ Volumes for Menominee County have been combined with Shawano County.

Table 45. — Net volume of sawtimber on commercial forest land by county and species group, Wisconsin, 1968
(Thousand board feet)[1]

County	All species	Softwoods	Oak	Yellow birch	Hard maple	Ash	Aspen	Elm	Other hardwoods
Adams	234,402	70,533	95,960	1,563	8,737	4,893	15,048	15,027	22,641
Ashland	651,481	256,355	38,161	32,555	65,568	32,310	92,937	40,891	92,704
Barron	204,412	55,725	26,496	9,374	22,537	9,173	36,549	16,086	28,472
Bayfield	844,308	351,977	58,916	33,530	66,419	38,400	144,409	42,087	108,570
Brown	87,729	7,589	16,700	508	8,545	7,130	2,316	24,379	20,562
Buffalo	406,468	4,773	232,621	290	25,318	9,855	25,217	36,213	72,181
Burnett	292,939	96,487	55,191	7,395	16,975	10,646	61,354	17,484	27,407
Calumet	47,294	3,524	17,757	173	3,404	3,188	1,185	8,505	9,558
Chippewa	224,317	56,202	79,264	2,824	14,345	5,766	18,473	19,775	27,668
Clark	306,826	81,634	89,642	4,981	24,492	8,916	23,860	31,295	42,006
Columbia	159,947	6,576	86,949	347	7,919	6,847	5,035	19,551	26,723
Crawford	288,695	3,327	171,013	218	15,247	6,199	20,896	24,375	47,420
Dane	161,916	4,244	102,855	182	7,404	4,587	5,087	14,331	23,226
Dodge	63,372	3,376	21,517	223	5,057	4,633	1,569	13,640	13,357
Door	177,249	33,333	27,116	818	16,433	12,873	5,805	44,541	36,330
Douglas	534,483	206,758	41,687	18,931	38,874	21,895	112,453	34,484	59,401
Dunn	303,749	4,021	171,557	230	19,316	7,242	20,170	28,037	53,176
Eau Claire	174,828	46,190	73,275	1,342	7,582	3,645	12,875	11,750	18,169
Florence	504,039	185,522	7,032	81,669	126,109	2,078	28,474	40,712	32,443
Fond du Lac	75,979	6,427	30,966	210	4,366	5,066	1,757	12,223	14,964
Forest	791,849	369,493	8,431	58,547	169,794	8,700	57,960	41,135	77,789
Grant	324,837	3,943	195,808	260	17,341	6,683	23,543	26,642	50,617
Green	75,375	2,170	44,706	133	3,580	2,568	2,177	8,532	11,509
Green Lake	58,794	3,191	27,318	131	4,352	2,661	1,485	8,919	10,737
Iowa	231,416	2,860	134,280	168	12,280	5,072	16,357	19,910	40,489
Iron	482,476	151,805	35,623	24,687	54,409	26,924	74,280	43,251	71,497
Jackson	339,162	93,317	133,640	3,167	17,714	7,032	24,636	24,507	35,149
Jefferson	65,788	4,258	28,368	202	4,561	3,701	1,443	11,220	12,035
Juneau	281,361	67,754	114,082	2,376	12,182	8,572	16,913	24,357	35,125
Kenosha	21,979	1,120	6,998	99	2,234	1,371	475	4,897	4,785
Kewaunee	64,778	6,853	13,272	360	6,056	5,255	1,585	17,237	14,160
La Crosse	230,319	2,470	133,883	179	11,612	5,497	15,790	20,492	40,396
Lafayette	82,334	1,075	50,610	63	4,405	1,625	5,853	6,349	12,354
Langlade	500,221	124,981	11,875	23,842	162,480	9,151	45,776	57,301	64,815
Lincoln	557,306	167,770	26,493	16,391	86,547	46,310	37,384	84,217	92,194
Manitowoc	133,626	10,958	32,991	759	12,053	9,834	3,126	34,121	29,784

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Table 45 continued

County	All species	Softwoods	Oak	Yellow birch	Hard maple	Ash	Aspen	Elm	Other hardwoods
Marathon	577,480	127,003	149,652	13,396	61,166	22,257	36,723	73,764	93,519
Marinette	891,003	407,408	86,982	7,721	73,495	16,093	115,289	55,575	128,440
Marquette	117,412	26,064	53,406	647	3,966	3,328	6,202	9,564	14,235
Milwaukee	--	--	--	--	--	--	--	--	--
Monroe	278,083	65,568	135,592	1,825	11,508	5,128	15,734	16,554	26,174
Oconto	716,974	282,975	59,185	8,792	20,249	58,911	71,732	118,948	96,182
Oneida	966,649	659,429	55,606	32,329	35,747	6,984	103,094	11,796	61,664
Outagamie	110,892	10,854	29,082	517	8,599	9,319	3,129	24,663	24,729
Ozaukee	21,888	1,775	8,187	58	1,529	1,192	973	3,779	4,395
Pepin	111,649	1,208	62,922	84	6,574	2,803	7,771	10,116	20,171
Pierce	154,283	1,686	94,613	127	10,661	2,984	10,429	12,420	21,363
Polk	267,072	76,377	62,648	7,423	18,502	7,713	52,013	16,067	26,329
Portage	215,182	49,827	74,044	3,151	14,952	7,569	11,295	23,097	31,247
Price	894,095	348,478	56,554	45,399	87,478	52,940	114,290	65,334	123,622
Racine	33,908	1,935	9,260	159	3,111	2,396	805	8,387	7,855
Richland	235,290	3,632	139,349	176	16,813	4,838	14,728	20,491	35,263
Rock	66,806	1,849	39,035	93	3,693	2,571	2,025	7,064	10,476
Rusk	376,855	105,633	33,465	17,604	41,613	19,779	72,159	32,228	54,374
St. Croix	106,378	1,452	63,093	89	6,462	2,123	9,200	8,533	15,426
Sauk	364,253	4,241	219,394	277	22,681	7,514	24,236	30,280	55,630
Sawyer	702,867	264,993	46,805	30,057	61,697	33,441	129,760	45,665	90,449
Shawano[2/]	1,637,642	712,370	116,410	59,465	284,025	42,857	50,446	164,213	207,856
Sheboygan	79,395	6,573	29,300	288	5,411	5,148	2,275	14,749	15,651
Taylor	435,134	131,181	23,468	24,973	46,396	33,289	62,830	35,440	77,557
Trempealeau	248,464	3,288	147,744	196	14,721	5,260	16,919	20,429	39,907
Vernon	332,553	3,926	212,144	278	21,339	5,291	24,143	24,113	41,319
Vilas	735,999	444,972	38,614	40,692	81,675	1,162	74,822	5,260	48,802
Walworth	54,214	2,632	24,404	169	3,496	3,011	1,317	9,215	9,970
Washburn	337,019	111,700	38,278	11,312	25,777	14,874	73,834	23,442	37,802
Washington	86,316	5,931	23,619	445	7,441	6,341	1,754	21,237	19,548
Waukesha	67,434	4,919	36,291	117	2,335	3,131	2,428	7,688	10,525
Waupaca	171,025	45,087	51,483	2,091	10,149	6,490	10,409	18,992	26,324
Waushara	143,768	32,451	64,139	1,194	6,306	3,967	7,376	11,601	16,734
Winnebago	46,453	2,032	18,967	176	3,608	2,594	756	8,520	9,800
Wood	185,256	49,163	59,207	1,921	10,040	6,122	14,041	18,841	25,921
State total	21,755,745	6,497,203	4,805,995	641,968	2,119,462	765,718	2,109,189	1,906,538	2,909,672

1/ International 1/4-inch rule.
2/ Volumes for Menominee County have been combined with Shawano County.

Table 46. – Net volume of growing stock, sawtimber, and rough, rotten, and short-log trees (cull) on commercial forest land, by individual species, Wisconsin, 1968

Species	Growing stock	Sawtimber	Cull
	Million cubic feet	Million board feet[1/]	Million cubic feet
Softwoods:			
White pine	412.7	1,944.6	14.3
Red pine	241.1	843.9	1.2
Jack pine	417.6	561.3	16.8
White spruce group			
White spruce	81.7	203.9	.7
Norway spruce	--	--	--
Black spruce	92.0	50.5	3.2
Balsam fir	439.0	460.6	5.2
Hemlock	336.2	1,583.8	9.7
Tamarack	111.1	117.1	3.3
Northern white-cedar	342.4	730.4	30.4
Other softwoods			
Scotch pine	.4	1.0	.1
Eastern redcedar	.5	--	.2
Total softwoods	2,474.7	6,497.1	85.1
Hardwoods:			
White oak group			
White oak	320.0	883.6	97.7
Swamp white oak	10.2	32.6	4.3
Bur oak	75.8	174.9	23.4
Chinkapin oak	.1	.7	--
Select red oak group			
Northern red oak	992.8	2,889.2	98.3
Other red oak group			
Northern pin oak	187.1	327.5	73.7
Black oak	180.5	497.5	71.9
Hickory group			
Bitternut hickory	33.4	27.2	3.0
Shagbark hickory	74.0	80.1	4.2
Yellow birch	219.6	642.0	42.5
Hard maple group			
Black maple	.9	3.2	.1
Sugar maple	937.5	2,116.2	123.6
Soft maple group			
Red maple	595.7	841.6	85.7
Silver maple	51.0	138.6	11.3

(Continued on next page)

Table 46 continued

Species	Growing stock	Sawtimber	Cull
	Million cubic feet	Million board feet 1/	Million cubic feet
Hardwood species (Continued):			
American beech	25.8	87.0	7.6
Ash group			
White ash	148.9	272.8	7.6
Black ash	305.8	379.8	10.8
Green ash	50.9	113.1	7.4
Balsam poplar	32.6	80.6	2.2
Cottonwood	19.5	65.8	2.6
Paper birch group			
River birch	8.9	23.2	1.4
Paper birch	718.6	353.2	30.9
Bigtooth aspen	519.2	740.8	20.2
Quaking aspen	1,640.3	1,368.5	111.5
Basswood	559.6	1,005.8	38.3
Butternut	18.3	43.9	7.1
Black walnut	7.5	22.5	2.1
Black cherry	69.6	72.0	13.9
Elm group			
American elm	604.7	1,669.8	68.8
Slippery elm	57.2	159.5	8.5
Rock elm	33.5	77.3	.7
Other hardwoods			
Black willow	15.0	54.6	2.5
Boxelder	3.3	7.5	2.4
Northern catalpa	--	--	.2
Hackberry	1.0	3.0	.1
Honeylocust	--	--	.1
Red mulberry	.2	.7	--
Tupelo, blackgum	--	--	--
Sycamore	--	--	--
Black locust	2.4	2.3	.2
Noncommercial species	--	--	11.9
Total hardwoods	8,521.4	15,258.6	998.7
All species	10,996.1	21,755.7	1,083.8

1/ International 1/4-inch rule.

Table 47. – Net volume of timber in rough, rotten, and short-log (cull) trees on commercial forest land, by species and cull tree class, Wisconsin, 1968

(Million cubic feet)

Species	All cull trees	Rough trees	Short-log trees[1]	Rotten trees
Softwoods:				
White pine	14.3	5.7	6.4	2.2
Red pine	1.2	.5	.5	.2
Jack pine	16.8	13.3	2.4	1.1
White spruce	.7	.1	.4	.2
Black spruce	3.2	3.0	.1	.1
Balsam fir	5.2	3.1	1.0	1.1
Hemlock	9.7	3.0	2.8	3.9
Tamarack	3.3	1.7	1.0	.6
Northern white-cedar	30.4	9.8	5.3	15.3
Other softwoods	.3	.3	--	--
Total softwoods	85.1	40.5	19.9	24.7
Hardwoods:				
White oak	125.4	50.7	64.1	10.6
Select red oak	98.3	30.6	51.2	16.5
Other red oak	145.6	70.6	56.4	18.6
Hickory	7.2	3.3	3.0	.9
Yellow birch	42.5	13.0	10.9	18.6
Hard maple	123.7	39.5	48.3	35.9
Soft maple	97.0	41.4	29.8	25.8
Beech	7.6	1.7	3.8	2.1
Ash	25.8	12.8	7.0	6.0
Balsam poplar	2.2	.4	.6	1.2
Cottonwood	2.6	.1	2.2	.3
Paper birch	32.3	19.2	6.5	6.6
Bigtooth aspen	20.2	6.9	4.0	9.3
Quaking aspen	111.5	43.5	10.6	57.4
Basswood	38.3	11.8	15.4	11.1
Butternut	7.1	3.5	1.8	1.8
Black walnut	2.1	.9	.8	.4
Black cherry	13.9	9.0	3.1	1.8
Elm	78.0	25.5	43.0	9.5
Other hardwoods	5.5	2.9	1.5	1.1
Noncommercial species	11.9	11.3	--	.6
Total hardwoods	998.7	398.6	364.0	236.1
All species	1,083.8	439.1	383.9	260.8

1/ Volumes are for trees 9.0 inches d.b.h. and larger for softwoods and 11.0 inches d.b.h. and larger for hardwoods. Volumes for rough and rotten trees are for trees 5.0 inches d.b.h. and larger.

Table 48. – Net volume of short-log trees on commercial forest land, by species and diameter class, Wisconsin, 1968
(Million board feet)[1]

Species	All classes	Diameter class (inches at breast height)								
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0+
Softwoods:										
White pine	34.9	6.5	7.6	4.8	4.6	2.7	5.5	0.8	1.8	0.6
Red pine	6.9	2.3	.4	3.8	--	--	--	.4	--	--
Jack pine	24.8	15.5	3.4	5.9	--	--	--	--	--	--
White spruce	16.5	4.7	4.0	7.8	--	--	--	--	--	--
Black spruce	.4	.4	--	--	--	--	--	--	--	--
Balsam fir	24.9	13.9	4.3	6.7	--	--	--	--	--	--
Hemlock	45.0	20.6	10.0	7.8	.7	5.0	.4	--	.5	--
Tamarack	10.6	6.2	2.3	2.1	--	--	--	--	--	--
Northern white-cedar	96.9	57.1	26.3	9.3	3.5	.7	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--
Total softwoods	260.9	127.2	58.3	48.2	8.8	8.4	5.9	1.2	2.3	.6
Hardwoods:										
White oak	175.4	--	55.1	33.5	25.8	21.5	14.0	8.0	14.6	2.9
Select red oak	208.2	--	73.5	40.2	34.7	20.6	14.5	9.6	14.1	1.0
Other red oak	234.8	--	82.1	58.5	45.2	22.9	8.0	10.3	7.5	.3
Hickory	10.3	--	5.4	3.7	.7	.5	--	--	--	--
Yellow birch	114.7	--	48.9	17.4	22.9	14.2	.5	.6	8.0	2.2
Hard maple	402.5	--	127.9	115.7	65.8	45.3	23.4	13.8	9.2	1.4
Soft maple	162.7	--	62.5	33.7	29.8	14.9	3.4	2.2	8.7	7.5
Beech	32.6	--	.6	4.7	.9	9.6	13.7	.4	2.7	--
Ash	27.0	--	8.1	5.4	1.9	4.0	.2	6.1	1.0	.3
Balsam poplar	11.5	--	9.7	1.8	--	--	--	--	--	--
Cottonwood	7.5	--	.4	--	.4	--	--	.4	1.4	4.9
Paper birch	56.7	--	36.4	15.4	4.1	.3	--	.5	--	--
Bigtooth aspen	20.6	--	11.4	3.3	5.1	.8	--	--	--	--
Quaking aspen	97.7	--	66.7	25.6	4.5	.5	.4	--	--	--
Basswood	51.9	--	15.3	16.2	8.8	5.1	2.9	.5	1.9	1.2
Butternut	8.0	--	2.0	5.1	.8	.1	--	--	--	--
Black walnut	2.9	--	1.5	.8	--	.6	--	--	--	--
Black cherry	31.3	--	17.8	4.7	7.4	.6	.3	.5	--	--
Elm	220.7	--	65.5	53.3	34.9	27.4	10.0	3.9	16.2	9.5
Other hardwoods	5.4	--	4.3	.1	.1	.2	.1	.3	.3	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--
Total hardwoods	1,882.4	--	695.1	439.1	293.8	189.1	91.4	57.1	85.6	31.2
All species	2,143.3	127.2	753.4	487.3	302.6	197.5	97.3	58.3	87.9	31.8

1/ International 1/4-inch rule.

Table 49. – Net annual growth of growing stock on commercial forest land, by species and diameter class, Wisconsin, 1967
(Thousand cubic feet)

Species	All classes	Diameter class (inches at breast height)										
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0+
Softwoods:												
White pine	13,535	2,382	1,064	1,504	1,854	1,779	1,765	1,416	898	549	321	3
Red pine	12,628	5,966	1,736	1,082	1,010	1,192	853	531	182	66	10	--
Jack pine	27,425	17,341	6,107	2,691	1,022	226	34	4	--	--	--	--
White spruce	4,482	2,083	1,072	755	331	180	58	3	--	--	--	--
Black spruce	7,098	6,195	599	256	26	14	8	--	--	--	--	--
Balsam fir	29,378	20,045	5,733	2,542	903	134	21	--	--	--	--	--
Hemlock	10,127	709	1,130	1,449	1,659	1,505	1,277	927	538	343	365	225
Tamarack	6,447	5,076	896	294	149	18	14	--	--	--	--	--
Northern white-cedar	11,957	8,359	1,813	1,095	458	190	38	1	1	2	--	--
Other softwoods	28	13	8	3	4	--	--	--	--	--	--	--
Total softwoods	123,105	68,169	20,158	11,671	7,416	5,238	4,068	2,882	1,619	960	696	228
Hardwoods:												
White oak	11,219	3,202	1,523	1,801	1,685	1,285	875	471	198	95	76	8
Select red oak	31,889	7,097	4,618	4,671	4,689	3,454	2,726	2,110	1,214	588	660	62
Other red oak	12,092	4,031	1,905	1,782	1,538	1,215	743	442	274	97	64	1
Hickory	3,444	2,180	532	414	202	85	25	2	4	--	--	--
Yellow birch	7,317	2,458	1,210	1,024	929	637	559	318	111	58	12	1
Hard maple	38,861	18,775	5,694	4,400	3,035	2,624	2,018	1,243	716	232	115	9
Soft maple	31,970	18,281	4,673	3,405	2,154	1,487	849	484	322	141	138	36
Beech	812	282	37	70	104	86	90	67	30	29	17	--
Ash	15,325	8,347	2,656	1,909	1,279	647	270	76	49	48	36	8
Balsam poplar	1,133	363	161	219	135	131	46	30	22	23	3	--
Cottonwood	588	18	56	67	71	39	73	45	60	32	71	56
Paper birch	49,333	32,294	10,078	4,705	1,647	447	126	27	7	2	--	--
Bigtooth aspen	26,989	10,334	6,848	5,182	2,899	1,181	410	106	22	7	--	--
Quaking aspen	95,805	46,926	23,559	16,262	6,607	1,955	434	58	4	--	--	--
Basswood	22,701	8,361	4,945	4,063	,446	1,410	811	405	152	74	33	1
Butternut	551	85	56	170	124	83	25	6	2	--	--	--
Black walnut	192	7	47	34	32	32	30	7	2	1	--	--
Black cherry	3,548	2,250	687	357	168	58	16	12	--	--	--	--
Elm	22,418	7,485	3,058	2,899	2,747	2,243	1,614	1,009	643	339	310	71
Other hardwoods	821	189	134	103	156	75	77	55	20	9	3	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--	--	--
Total hardwoods	377,008	172,965	72,477	53,537	32,647	19,174	11,817	6,973	3,852	1,775	1,538	253
All species	500,113	241,134	92,635	65,208	40,063	24,412	15,885	9,855	5,471	2,735	2,234	481

Table 50. – Net annual growth of sawtimber on commercial forest land, by species and diameter class, Wisconsin, 1967
(Thousand board feet)[1]

Species	All classes	Diameter class (inches at breast height)								
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0+
Softwoods:										
White pine	76,195	30,253	9,461	9,376	9,298	7,821	4,938	3,141	1,887	20
Red pine	43,542	22,650	4,757	6,164	4,843	3,301	1,249	479	99	--
Jack pine	75,673	69,306	4,952	1,199	196	20	--	--	--	--
White spruce	10,723	8,131	1,441	860	276	15	--	--	--	--
Black spruce	7,296	7,072	112	73	39	--	--	--	--	--
Balsam fir	46,945	42,404	3,810	619	112	--	--	--	--	--
Hemlock	47,555	8,960	8,729	8,258	7,425	5,586	3,476	2,143	2,687	291
Tamarack	2,805	1,963	674	97	71	--	--	--	--	--
Northern white-cedar	26,975	23,841	2,094	854	173	7	6	--	--	--
Other softwoods	29	14	15	--	--	--	--	--	--	--
Total softwoods	337,738	214,594	36,045	27,500	22,433	16,750	9,669	5,763	4,673	311
Hardwoods:										
White oak	49,902	--	39,747	3,985	2,910	1,673	760	398	374	55
Select red oak	118,159	--	76,707	12,778	10,560	7,663	4,711	2,363	3,080	297
Other red oak	43,564	--	33,656	4,132	2,541	1,548	1,052	383	247	5
Hickory	10,257	--	9,624	427	169	27	10	--	--	--
Yellow birch	34,577	--	26,946	2,646	2,462	1,513	604	325	63	18
Hard maple	100,906	--	69,238	11,847	8,928	5,731	3,462	1,118	527	55
Soft maple	63,886	--	49,261	6,008	3,577	2,156	1,367	647	666	204
Beech	4,211	--	2,892	368	394	271	117	107	62	--
Ash	34,291	--	29,108	3,063	1,229	343	190	167	11	73
Balsam poplar	4,118	--	3,075	590	194	115	69	68	,	--
Cottonwood	2,288	--	973	185	301	172	208	96	193	160
Paper birch	43,793	--	40,716	2,252	613	148	45	19	--	--
Bigtooth aspen	78,571	--	67,061	7,113	3,130	983	241	43	--	--
Quaking aspen	164,719	--	150,066	11,183	2,902	544	24	--	--	--
Basswood	68,586	--	56,193	6,154	3,448	1,731	594	318	141	7
Butternut	3,636	--	3,173	335	91	28	9	--	--	--
Black walnut	1,013	--	740	121	115	28	8	1	--	--
Black cherry	4,866	--	4,512	217	79	58	--	--	--	--
Elm	92,103	--	64,351	10,583	7,493	4,564	2,668	1,315	1,000	129
Other hardwoods	2,481	--	1,358	326	354	247	127	46	23	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--
Total hardwoods	925,927	--	729,397	84,313	51,490	29,543	16,266	7,414	6,501	1,003
All species	1,263,665	214,594	765,442	111,813	73,923	46,293	25,935	13,177	11,174	1,314

1/ International 1/4-inch rule.

Table 51. – Net annual growth of growing stock on commercial forest land, by species and Forest Survey Unit, Wisconsin, 1967
(Thousand cubic feet)

Species	All units	Northeastern units	Northwestern units	Central units	Southwestern units	Southeastern units
Softwoods:						
White pine	13,535	5,586	4,045	3,562	258	84
Red pine	12,628	6,008	3,712	2,424	468	16
Jack pine	27,425	6,192	11,850	9,118	240	25
White spruce	4,482	3,137	1,304	18	--	23
Black spruce	7,098	4,035	2,676	384	--	3
Balsam fir	29,378	14,421	14,006	912	--	39
Hemlock	10,127	6,517	2,296	1,173	--	141
Tamarack	6,447	1,570	2,832	1,742	3	300
Northern white cedar	11,957	5,897	2,103	1,943	--	2,014
Other softwoods	28	--	--	18	7	3
Total softwoods	123,105	53,363	44,824	21,294	976	2,648
Hardwoods:						
White oak	11,219	241	2,221	3,892	3,538	1,327
Select red oak	31,889	7,988	7,697	7,090	7,433	1,681
Other red oak	12,092	1,286	1,524	4,971	3,381	930
Hickory	3,444	115	173	363	2,398	395
Yellow birch	7,317	2,877	3,131	1,195	25	89
Hard maple	38,861	15,064	18,779	2,513	1,675	830
Soft maple	31,970	6,933	13,344	7,840	2,328	1,525
Beech	812	256	--	22	--	534
Ash	15,325	4,509	6,229	1,670	969	1,948
Balsam poplar	1,133	710	247	6	15	155
Cottonwood	588	78	7	--	372	131
Paper birch	49,333	17,763	23,352	5,709	1,760	749
Bigtooth aspen	26,989	7,523	9,975	6,013	2,884	594
Quaking aspen	95,805	28,292	45,724	15,561	3,064	3,164
Basswood	22,701	7,933	10,335	1,719	2,145	569
Butternut	551	126	71	72	250	32
Black walnut	192	--	--	3	140	49
Black cherry	3,548	1,229	860	361	620	478
Elm	22,418	7,136	5,690	3,041	3,326	3,225
Other hardwoods	821	54	7	72	425	263
Noncommercial species	--	--	--	--	--	--
Total hardwoods	377,008	110,113	149,366	62,113	36,748	18,668
All species	500,113	163,476	194,190	83,407	37,724	21,316

Table 52. – Net annual growth of sawtimber on commercial forest land, by species and Forest Survey Unit, Wisconsin, 1967
(Thousand board feet)[1]

Species	All units	Northeastern unit	Northwestern unit	Central unit	Southwestern unit	Southeastern unit
Softwoods:						
White pine	76,195	33,331	26,502	15,456	374	532
Red pine	43,542	23,416	13,728	6,310	85	3
Jack pine	75,673	17,392	33,764	23,366	58	1,093
White spruce	10,723	6,075	4,608	29	--	11
Black spruce	7,296	4,389	2,865	42	--	--
Balsam fir	46,945	17,557	27,668	807	--	913
Hemlock	47,555	31,298	11,510	4,546	--	201
Tamarack	2,805	500	1,878	315	--	112
Northern white-cedar	26,975	11,628	5,841	2,790	--	6,716
Other softwoods	29	--	--	29	--	--
Total softwoods	337,738	145,586	128,364	53,690	517	9,581
Hardwoods:						
White oak	49,902	1,293	5,304	17,861	19,691	5,753
Select red oak	118,159	21,752	23,859	28,541	37,192	6,815
Other red oak	43,564	2,452	3,402	17,638	16,517	3,555
Hickory	10,257	1,496	39	1,514	5,342	1,866
Yellow birch	34,577	16,971	14,205	2,634	671	96
Hard maple	100,906	42,290	39,457	9,672	6,109	3,378
Soft maple	63,886	18,956	20,162	14,663	6,746	3,359
Beech	4,211	1,288	--	49	--	2,874
Ash	34,291	5,977	10,837	5,940	3,417	8,120
Balsam poplar	4,118	1,644	1,296	--	--	1,178
Cottonwood	2,288	170	--	--	1,717	401
Paper birch	43,793	17,763	13,703	2,431	5,626	4,270
Bigtooth aspen	78,571	24,059	25,944	10,300	13,593	4,675
Quaking aspen	164,719	51,108	85,221	22,083	4,044	2,263
Basswood	68,586	12,646	38,691	4,067	10,110	3,072
Butternut	3,636	1,795	99	118	1,607	17
Black walnut	1,013	--	--	12	870	131
Black cherry	4,866	1,049	12	592	725	2,488
Elm	92,103	24,741	25,524	11,488	15,685	14,665
Other hardwoods	2,481	941	5	278	680	577
Noncommercial species	--	--	--	--	--	--
Total hardwoods	925,927	248,391	307,760	149,881	150,342	69,553
All species	1,263,665	393,977	436,124	203,571	150,859	79,134

1/ International 1/4-inch rule.

Table 53. — Timber removals from growing stock on commercial forest land, by item and softwoods and hardwoods, Wisconsin, 1967
(Thousand cubic feet)

Item	All species	Softwoods	Hardwoods
Roundwood products:			
Saw logs	43,216	4,770	38,446
Veneer logs and bolts	3,345	10	3,335
Pulpwood	100,664	21,416	79,248
Cooperage logs and bolts	183	--	183
Piling	75	17	58
Poles	387	368	19
Posts	1,677	943	734
Other	4,680	--	4,680
Fuelwood	5,951	115	5,836
All products	160,178	27,639	132,539
Logging residues	14,972	1,217	13,755
Other removals	58,000	1,100	56,900
Total removals	233,150	29,956	203,194

Table 54. — Timber removals from live sawtimber on commercial forest land, by item and softwoods and hardwoods, Wisconsin, 1967
(Thousand board feet)[1]

Item	All species	Softwoods	Hardwoods
Roundwood products:			
Saw logs	258,207	28,341	229,866
Veneer logs and bolts	21,769	65	21,704
Pulpwood	238,334	64,172	174,162
Cooperage logs and bolts	1,372	--	1,372
Piling	454	88	366
Poles	1,559	1,484	75
Posts	2,586	989	1,597
Other	24,396	--	24,396
Fuelwood	19,521	387	19,134
All products	568,198	95,526	472,672
Logging residues	23,270	1,613	21,657
Other removals	58,700	2,900	55,800
Total removals	650,168	100,039	550,129

1/ International 1/4-inch rule.

Table 55. — Timber removals from growing stock on commercial forest land, by species and Forest Survey Unit, Wisconsin, 1967
(Thousand cubic feet)

Species	All units	Northeastern unit	Northwestern unit	Central unit	Southwestern unit	Southeastern unit
Softwoods:						
White pine	4,162	2,241	693	925	171	132
Red pine	1,770	696	560	448	37	29
Jack pine	13,295	3,179	4,978	5,021	55	62
White spruce	543	392	129	8	--	14
Black spruce	612	441	145	23	--	3
Balsam fir	3,963	2,193	1,705	52	--	13
Hemlock	4,237	2,737	1,204	232	--	64
Tamarack	329	130	110	64	1	24
Northern white-cedar	1,043	637	40	106	--	260
Other softwoods	2	--	--	1	1	--
Total softwoods	29,956	12,646	9,564	6,880	265	601
Hardwoods:						
White oak	8,142	64	749	2,426	3,819	1,084
Select red oak	24,558	1,422	3,160	8,950	9,703	1,323
Other red oak	9,083	526	1,168	3,310	3,589	490
Hickory	2,013	236	197	288	1,192	100
Yellow birch	3,037	1,573	1,079	371	8	6
Hard maple	17,551	6,303	6,110	2,510	1,972	656
Soft maple	9,732	1,494	3,456	2,793	1,036	953
Beech	334	189	--	15	--	130
Ash	7,116	1,291	3,526	1,221	610	468
Balsam poplar	85	--	67	3	3	12
Cottonwood	449	14	3	43	215	174
Paper birch	10,497	1,994	6,661	1,125	634	83
Bigtooth aspen	21,059	9,944	8,360	1,851	815	89
Quaking aspen	66,532	31,417	27,657	5,849	1,327	282
Basswood	8,198	1,227	3,457	1,304	1,816	394
Butternut	343	66	58	52	148	19
Black walnut	292	3	1	9	258	21
Black cherry	462	199	147	43	46	27
Elm	13,300	2,937	3,166	2,772	2,309	2,116
Other hardwoods	411	79	82	130	85	35
Noncommercial species	--	--	--	--	--	--
Total hardwoods	203,194	60,978	69,104	35,065	29,585	8,462
All species	233,150	73,624	78,668	41,945	29,850	9,063

Table 56. – Timber removals from live sawtimber on commercial forest land, by species and Forest Survey Unit, Wisconsin, 1967
(Thousand board feet)[1]

Species	All units	Northeastern unit	Northwestern unit	Central unit	Southwestern unit	Southeastern unit
Softwoods:						
White pine	22,414	12,637	3,466	4,564	984	763
Red pine	6,196	3,026	1,739	1,294	57	80
Jack pine	28,247	6,741	10,702	10,507	121	176
White spruce	3,386	2,443	832	54	--	57
Black spruce	838	604	169	51	--	14
Balsam fir	14,227	7,900	6,141	137	--	49
Hemlock	21,414	13,902	6,036	1,108	--	368
Tamarack	985	466	358	108	--	53
Northern white-cedar	2,331	1,349	112	158	--	712
Other softwoods	1	--	--	1	--	--
Total softwoods	100,039	49,068	29,555	17,982	1,162	2,272
Hardwoods:						
White oak	23,911	349	1,695	6,870	10,310	4,687
Select red oak	91,847	6,880	8,276	32,179	38,247	6,265
Other red oak	26,226	1,965	2,363	9,188	10,921	1,789
Hickory	3,188	526	365	645	1,394	258
Yellow birch	11,962	6,776	3,912	1,178	51	45
Hard maple	63,978	31,118	13,593	9,234	7,128	2,905
Soft maple	24,623	5,351	5,514	7,251	1,871	4,636
Beech	1,560	942	--	60	--	558
Ash	17,038	4,259	6,672	3,110	1,379	1,618
Balsam poplar	179	--	144	21	2	12
Cottonwood	1,853	74	5	243	642	889
Paper birch	19,622	6,105	11,178	1,522	621	196
Bigtooth aspen	64,025	32,861	23,968	5,698	1,179	319
Quaking aspen	118,278	60,706	44,277	10,527	2,179	589
Basswood	28,330	6,604	8,568	5,048	6,305	1,805
Butternut	1,304	279	196	244	544	41
Black walnut	1,677	25	9	56	1,446	141
Black cherry	1,598	624	397	162	256	159
Elm	46,906	12,885	8,609	9,726	5,842	9,844
Other hardwoods	2,024	472	291	770	446	45
Noncommercial species	--	--	--	--	--	--
Total hardwoods	550,129	178,801	140,032	103,732	90,763	36,801
All species	650,168	227,869	169,587	121,714	91,925	39,073

1/ International 1/4-inch rule.

Table 57. – Net annual growth and removals of growing stock on commercial forest land, by species, Wisconsin, 1967

(Thousand cubic feet)[1]

Species	Net Annual Growth	Annual Timber Removals
Softwoods:		
White pine	13,535	4,162
Red pine	12,628	1,770
Jack pine	27,425	13,295
White spruce	4,482	543
Black spruce	7,098	612
Balsam fir	29,378	3,963
Hemlock	10,127	4,237
Tamarack	6,447	329
Northern white-cedar	11,957	1,043
Other softwoods	28	2
Total softwoods	123,105	29,956
Hardwoods:		
White oak	11,219	8,142
Select red oak	31,889	24,558
Other red oak	12,092	9,083
Hickory	3,444	2,013
Yellow birch	7,317	3,037
Hard maple	38,861	17,551
Soft maple	31,970	9,732
Beech	812	334
Ash	15,325	7,116
Balsam poplar	1,133	85
Cottonwood	588	449
Paper birch	49,333	10,497
Bigtooth aspen	26,989	21,059
Quaking aspen	95,805	66,532
Basswood	22,701	8,198
Butternut	551	343
Black walnut	192	292
Black cherry	3,548	462
Elm	22,418	13,300
Other hardwoods	821	411
Noncommercial species	--	--
Total hardwoods	377,008	203,194
All species	500,113	233,150

Table 58. – Net annual growth and removals of sawtimber on commercial forest land, by species, Wisconsin, 1967

(Thousand board feet)[1]

Species	Net Annual Growth	Annual Timber Removals
Softwoods:		
White pine	76,195	22,414
Red pine	43,542	6,196
Jack pine	75,673	28,247
White spruce	10,723	3,386
Black spruce	7,296	838
Balsam fir	46,945	14,227
Hemlock	47,555	21,414
Tamarack	2,805	985
Northern white-cedar	26,975	2,331
Other softwoods	29	1
Total softwoods	337,738	100,039
Hardwoods:		
White oak	49,902	23,911
Select red oak	118,159	91,847
Other red oak	43,564	26,226
Hickory	10,257	3,188
Yellow birch	34,577	11,962
Hard maple	100,906	63,978
Soft maple	63,886	24,623
Beech	4,211	1,560
Ash	34,291	17,038
Balsam poplar	4,118	179
Cottonwood	2,288	1,853
Paper birch	43,793	19,622
Bigtooth aspen	78,571	64,025
Quaking aspen	164,719	118,278
Basswood	68,586	28,330
Butternut	3,636	1,304
Black walnut	1,013	1,677
Black cherry	4,866	1,598
Elm	92,103	46,906
Other hardwoods	2,481	2,024
Noncommercial species	--	--
Total hardwoods	925,927	550,129
All species	1,263,665	650,168

1/ International 1/4-inch rule.

Table 59. – Net annual growth and removals of growing stock on commercial forest land, by ownership class and softwoods and hardwoods, Wisconsin, 1967 (Thousand cubic feet)

Ownership class	Net annual growth			Annual removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
National Forest	52,867	17,438	35,429	20,699	2,419	18,280
Other public	119,649	31,891	87,758	32,196	5,605	26,591
Forest industry	48,979	16,402	32,577	35,195	8,435	26,760
Farmer and miscellaneous private	278,618	57,374	221,244	145,060	13,497	131,563
All ownerships	500,113	123,105	377,008	233,150	29,956	203,194

Table 60. – Net annual growth and removals of sawtimber on commercial forest land, by ownership class and softwoods and hardwoods, Wisconsin, 1967 (Thousand board feet)[1]

Ownership class	Net annual growth			Annual removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
National Forest	124,055	52,595	71,460	40,712	7,760	32,952
Other public	219,900	81,682	138,218	59,863	16,141	43,722
Forest industry	135,469	53,093	82,376	103,693	32,242	71,451
Farmer and miscellaneous private	784,241	150,368	633,873	445,900	43,896	402,004
All ownerships	1,263,665	337,738	925,927	650,168	100,039	550,129

1/ International 1/4-inch rule.

Table 61. – Annual mortality of growing stock and sawtimber on commercial forest land, by species, Wisconsin, 1967

Species	Growing stock thousand cubic feet	Sawtimber thousand board feet 1/
Softwoods:		
White pine	1,154	4,075
Red pine	446	2,481
Jack pine	3,397	5,172
White spruce	64	251
Black spruce	622	307
Balsam fir	3,896	6,178
Hemlock	2,386	11,097
Tamarack	675	954
Northern white-cedar	1,748	4,273
Other softwoods	--	--
Total softwoods	14,388	34,788
Hardwoods:		
White oak	865	1,003
Select red oak	5,435	16,920
Other red oak	3,568	6,248
Hickory	175	84
Yellow birch	1,157	2,788
Hard maple	1,097	1,957
Soft maple	1,546	2,943
Beech	--	--
Ash	1,873	4,170
Balsam poplar	249	309
Cottonwood	--	--
Paper birch	1,247	868
Bigtooth aspen	2,248	3,282
Quaking aspen	15,986	9,690
Basswood	393	434
Butternut	455	1,016
Black walnut	--	--
Black cherry	583	420
Elm	8,404	24,451
Other hardwoods	244	35
Noncommercial species	--	--
Total hardwoods	45,525	76,618
All species	59,913	111,406

1/ International 1/4-inch rule.

Table 62. – Annual mortality of growing stock and sawtimber on commercial forest land, by ownership class and softwoods and hardwoods, Wisconsin, 1967

Ownership class	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	Thousand cubic feet			Thousand board feet 1/		
National Forest	4,525	1,399	3,126	1,306	760	546
Other public	11,620	3,187	8,433	14,357	6,739	7,618
Forest industry	6,996	3,537	3,459	17,277	11,822	5,455
Farmer and miscellaneous private	36,772	6,265	30,507	78,466	15,467	62,999
All ownerships	59,913	14,388	45,525	111,406	34,788	76,618

1/ International 1/4-inch rule.

Table 63. – Annual mortality of growing stock and sawtimber on commercial forest land, by cause and softwoods and hardwoods, Wisconsin, 1967

Csuse	Growing stock			Sswtimber		
	All species	Soft- woods	Hsrd- woods	All species	Soft- woods	Hard- woods
	Thousand cubic feet			Thoussnd bosrd feet 1/		
Fire	131	131	--	--	--	--
Animals	752	203	549	861	127	734
Insects	952	909	43	1,265	1,265	--
Westher	13,478	4,198	9,280	29,836	11,891	17,945
Disesse	31,124	4,268	26,856	56,075	9,872	46,203
Suppression	886	339	547	995	995	--
Logging	1,416	803	613	3,253	2,368	885
Unknown snd other	10,717	3,537	7,180	18,140	8,270	9,870
Timber stand improvement	457	--	457	981	--	981
All csuses	59,913	14,388	45,525	111,406	34,788	76,618

1/ International 1/4-inch rule.

Table 64. – Output of timber products, by source of material and softwoods and hardwoods, Wisconsin, 1967

Products and species group	Standard unit	Total output		Roundwood products		Plant byproducts	
		No. of std. units	M cu. ft.	No. of std. units	M cu. ft.	No. of std. units	M cu. ft.
Saw logs:	M bd. ft.[1/]						
Softwood		28,680	4,839	28,680	4,839	--	--
Hardwood		243,830	40,256	243,830	40,256	--	--
Total		272,510	45,095	272,510	45,095	--	--
Veneer logs and bolts:	M bd. ft.						
Softwood		69	11	69	11	--	--
Hardwood		22,915	3,678	22,915	3,678	--	--
Total		22,984	3,689	22,984	3,689	--	--
Pulpwood:	Std. cords[2/]						
Softwood		290,186	22,888	279,821	22,071	10,365	817
Hardwood		1,126,350	88,953	1,025,578	80,994	100,772	7,959
Total		1,416,536	111,841	1,305,399	103,065	111,137	8,776
Cooperage:	M bd. ft.						
Softwood		--	--	--	--	--	--
Hardwood		1,532	209	1,532	209	--	--
Total		1,532	209	1,532	209	--	--
Piling:	M linear ft.						
Softwood		43	17	43	17	--	--
Hardwood		76	58	76	58	--	--
Total		119	75	119	75	--	--
Poles:	M pieces						
Softwood		44	368	44	368	--	--
Hardwood		2	19	2	19	--	--
Total		46	387	46	387	--	--
Posts (round and split):	M pieces						
Softwood		1,023	1,027	1,023	1,027	--	--
Hardwood		1,198	1,178	1,198	1,178	--	--
Total		2,221	2,205	2,221	2,205	--	--
Other: [3/]	M cu. ft.						
Softwood		288	288	--	--	288	288
Hardwood		8,443	8,443	4,687	4,687	3,756	3,756
Total		8,731	8,731	4,687	4,687	4,044	4,044
Total industrial products:							
Softwood		--	29,438	--	28,333	--	1,105
Hardwood		--	142,794	--	131,079	--	11,715
Total		--	172,232	--	159,412	--	12,820
Fuelwood:	Std. cords						
Softwood		11,000	767	6,300	433	4,700	334
Hardwood		385,400	26,903	309,100	21,566	76,300	5,337
Total		396,400	27,670	315,400	21,999	81,000	5,671
All products:							
Softwood		--	30,205	--	28,766	--	1,439
Hardwood		--	169,697	--	152,645	--	17,052
Total		--	199,902	--	181,411	--	18,491

1/ M (meaning thousand) board feet by International 1/4-inch rule.
2/ Rough-wood basis (include chips converted to equivalent standard cords).
3/ Includes roundwood used in manufacturing moulded products, heading, lath, shavings, particleboard, excelsior, charcoal, etc.

Table 65. — Output of roundwood products, by source and softwoods and hardwoods, Wisconsin, 1967
(Thousand cubic feet)

Products and species group	All sources	Growing stock trees 1/			Rough and rotten trees	Salvable dead trees	Other sources 2/
		Total	Sawtimber	Poletimber			
Industrial products							
Sawlogs:							
Softwood	4,839	4,770	4,770	--	62	--	7
Hardwood	40,256	38,446	38,407	39	1,122	105	583
Total	45,095	43,216	43,177	39	1,184	105	590
Veneer logs and bolts:							
Softwood	11	10	10	--	1	--	--
Hardwood	3,678	3,335	3,335	--	343	--	--
Total	3,689	3,345	3,345	--	344	--	--
Pulpwood:							
Softwood	22,071	21,416	15,169	6,247	575	--	80
Hardwood	80,994	79,248	37,292	41,956	334	222	1,190
Total	103,065	100,664	52,461	48,203	909	222	1,270
Misc. industrial products							
Cooperage:							
Softwood	--	--	--	--	--	--	--
Hardwood	209	183	183	--	14	--	12
Total	209	183	183	--	14	--	12
Piling:							
Softwood	17	17	17	--	--	--	--
Hardwood	58	58	58	--	--	--	--
Total	75	75	75	--	--	--	--
Poles:							
Softwood	368	368	310	58	--	--	--
Hardwood	19	19	16	3	--	--	--
Total	387	387	326	61	--	--	--
Posts (round and split):							
Softwood	1,027	943	242	701	9	--	75
Hardwood	1,178	734	310	424	222	--	222
Total	2,205	1,677	552	1,125	231	--	297
Other: 3/							
Softwood	--	--	--	--	--	--	--
Hardwood	4,687	4,680	3,398	1,282	5	--	2
Total	4,687	4,680	3,398	1,282	5	--	2
All misc. industrial products:							
Softwood	1,412	1,328	569	759	9	--	75
Hardwood	6,151	5,674	3,965	1,709	241	--	236
Total	7,563	7,002	4,534	2,468	250	--	311
All industrial products:							
Softwood	28,333	27,524	20,518	7,006	647	--	162
Hardwood	131,079	126,703	82,999	43,704	2,040	327	2,009
Total	159,412	154,227	103,517	50,710	2,687	327	2,171
Fuelwood:							
Softwood	433	115	66	49	22	--	296
Hardwood	21,566	5,836	3,391	2,445	1,210	--	14,520
Total	21,999	5,951	3,457	2,494	1,232	--	14,816
All products;							
Softwood	28,766	27,639	20,584	7,055	669	--	458
Hardwood	152,645	132,539	86,390	46,149	3,250	327	16,529
Total	181,411	160,178	106,974	53,204	3,919	327	16,987

1/ On commercial forest land.

2/ Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas or material from noncommercial forest land or nonforest land such as fence rows or suburban areas.

3/ Includes roundwood used in manufacturing molded products, heading, lath, shavings, particle board, excelsior, charcoal, etc.

Table 66. – A comparison of the number of primary wood-using plants operating in 1956 and 1967 by Forest Survey Unit, Wisconsin

(In number of plants)

Kind of mill 1/	All units		Northeastern unit		Northwestern unit		Central unit		Southwestern unit		Southeastern unit	
	1956	1967	1956	1967	1956	1967	1956	1967	1956	1967	1956	1967
Sawmills:												
Large 2/	8	6	5	5	--	--	3	1	--	--	--	--
Medium 3/	55	73	13	17	17	12	7	14	13	23	5	7
Small	1,565	739	306	125	340	130	403	182	301	175	215	127
Total	1,628	818	324	147	357	142	413	197	314	198	220	134
Veneer mills												
Standard grade	21	16	8	6	3	4	6	3	1	--	3	3
Container	26	10	4	1	3	2	6	1	4	1	9	5
Total	47	26	12	7	6	6	12	4	5	1	12	8
Cooperage mills	5	3	--	--	--	--	--	--	2	3	3	--
Handle plants	--	--	--	--	--	--	--	--	--	--	--	--
Pulp mills	29	27	7	7	3	3	10	9	--	--	9	8
Charcoal plants	4	2	--	--	1	--	1	--	1	1	1	1
Misc. plants 4/	40	22	6	4	8	7	9	4	9	6	8	1
TOTAL	1,753	898	349	165	375	158	445	214	331	209	253	152

1/ Excludes idle mills.
2/ Annual lumber output of 5 million board feet or more.
3/ Annual lumber output from 1 million to 4.999 million board feet.
4/ Includes lath, particleboard, shaving, excelsior, fence plants, and specialty plants.

Table 67. – Volume of unused residues at primary manufacturing plants, by industry, type of residue, and softwoods and hardwoods, Wisconsin, 1968

(Thousand cubic feet)

Species and type of residue	All industries	Lumber	Veneer	Cooperage	Other
Softwoods					
Course 1/	131	131	--	--	--
Fine 2/	427	427	--	--	--
Total	558	558	--	--	--
Hardwoods					
Course 1/	816	780	25	6	5
Fine 2/	2,669	2,540	110	12	7
Total	3,485	3,320	135	18	12
All species					
Course 1/	947	911	25	6	5
Fine 2/	3,096	2,967	110	12	7
Total	4,043	3,878	135	18	12

1/ Material suitable for chipping such as slabs, edgings, and veneer cores.
2/ Residues not suitable for chipping, such as sawdust and shavings.

Table 68. – Value of timber products to producer, by Forest Survey Unit, Wisconsin, 1968[1]

(Thousand dollars)

Survey unit	All products	Product		
		Pulpwood	Lumber logs	All others
Northeastern unit	15,685	10,420	3,855	1,410
Northwestern unit	10,720	7,970	1,605	1,145
Central unit	7,000	3,170	2,655	1,175
Southwestern unit	4,325	65	2,905	1,355
Southeastern unit	2,015	70	1,495	450
All units	39,745	21,695	12,515	5,535

1/ Value delivered to the mill.

Table 69. – Removals,[1] net annual growth, and inventory of growing stock and sawtimber on commercial forest land, Wisconsin, 1968, and low removals option projections[2] to 1998

GROWING STOCK

Year	Removals			Growth			Inventory		
	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods
	(Million cubic feet)								
1968	233.2	30.0	203.2	500.1	123.1	377.0	10,996.1	2,474.7	8,521.4
1978	270.1	45.0	225.1	538.4	143.3	395.1	13,701.7	3,440.8	10,260.9
1988	333.7	72.0	261.7	552.4	148.7	403.7	16,157.8	4,331.9	11,825.9
1998	426.3	109.9	316.4	545.3	144.4	400.9	17,826.4	4,874.7	12,951.7
	SAWTIMBER								
	(Million board feet)[3]								
1968	650	100	550	1,264	338	926	21,756	6,497	15,259
1978	766	164	602	1,600	469	1,131	29,291	9,174	20,117
1988	1,019	269	750	1,863	560	1,303	37,880	12,259	25,621
1998	1,387	423	964	1,997	594	1,403	45,202	14,568	30,634

1/ Timber removals includes volume "lost" due to land clearing, flooding, thinning, or changes in land use, in addition to timber cut and used.

2/ Based on the following assumptions: (a) that the removals rate will be lower than that for the high removals option, (b) that timber removals for products will increase during the 30-year period at an increasing rate each 10-year period, (c) that the total area of commercial forest land will continue to decline at a rate of 0.141 percent per year, (d) that radial growth will decline over time in relation to the increase of basal area per acre of trees, (e) that the intensity of forest management practiced will continue at the rate indicated by recent trends, (f) that use of both hardwoods and softwoods for pulpwood will increase, but use of hardwoods will increase at a slower rate for most of the projection period.

3/ International 1/4-inch rule.

Table 70. – Removals,[1] net annual growth, and inventory of growing stock and sawtimber on commercial forest land, Wisconsin, 1968, and high removals option projections[2] to 1998

GROWING STOCK

Year	Removals			Growth			Inventory		
	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods
	(Million cubic feet)								
1968	233.2	30.0	203.2	500.1	123.1	377.0	10,996.1	2,474.7	8,521.4
1978	305.8	53.4	252.4	533.5	142.1	391.4	13,514.6	3,398.2	10,116.4
1988	407.9	100.0	307.9	538.3	145.2	393.1	15,298.0	4,076.0	11,222.0
1998	507.2	139.9	367.3	527.6	141.3	386.3	16,003.4	4,281.0	11,722.4
	SAWTIMBER								
	(Million board feet)[3]								
1968	650	100	550	1,264	338	926	21,756	6,497	15,259
1978	867	195	672	1,584	464	1,120	28,759	9,020	19,739
1988	1,244	370	874	1,803	541	1,262	35,272	11,308	23,964
1998	1,624	525	1,099	1,895	564	1,331	39,369	12,300	27,069

1/ Timber removals includes volume "lost" due to land clearing, flooding, thinning, or changes in land use, in addition to timber cut and used.

2/ Based on the following assumptions: (a) that the removals rate will be higher than that for the low removals option, (b) that timber removals for products will increase during the 30-year period but at a decreasing rate each 10-year period, (c) that the total area of commercial forest land will continue to decline at a rate of 0.141 percent per year, (d) that radial growth will decline over time in relation to the increase of basal area per acre of trees, (e) that the intensity of forest management practiced will continue at the rate indicated by recent trends, (f) that use of both hardwoods and softwoods for pulpwood will increase, but use of hardwoods will increase at a slower rate for most of the projection period.

3/ International 1/4-inch rule.

☆U.S. Government Printing Office: 1973 – 761-326

Spencer, John S., Jr., and Harry W. Thorne.

1972. Wisconsin's 1968 timber resource – a perspective. North Cent. For. Exp. Stn., St. Paul, Minn. 80 p., illus. (USDA For. Serv. Resour. Bull. NC-15)

The third inventory of Wisconsin's timber resource shows substantial gains in growing-stock and sawtimber volumes since 1956, in spite of a small decline in area of commercial forest land. Presented are text and statistics on forest area and timber volume, growth, mortality, ownership, stocking, and use in 1968. Two 30-year projections of timber growth, removals, and inventory are also presented – one assuming a high level of future timber removals and the other a low level.

OXFORD: 524.1:905.2(775). KEY WORDS: timber volume, growth, utilization, forest areas.

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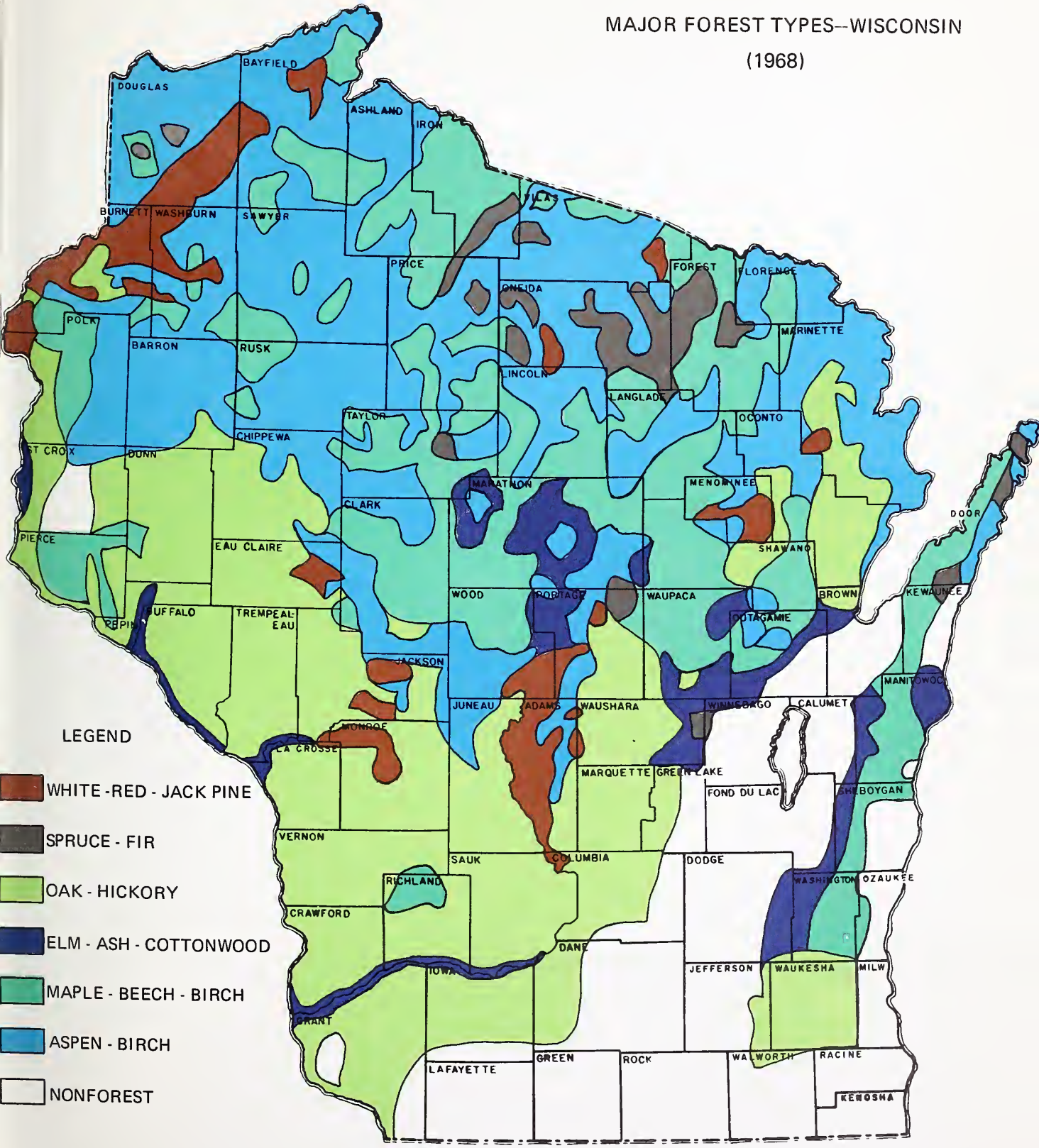
QWN 9-8-93

MAJOR FOREST TYPES--WISCONSIN

(1968)



TWO OTHER REPORTS DEALING WITH WISCONSIN'S TIMBER RESOURCE PUBLISHED RECENTLY ARE:

Forest area in Wisconsin counties, 1968, by Burton L. Essex. USDA For. Serv. Res. Note NC-135, 4 p., illus. 1972.

Timber volume in Wisconsin counties, by Arnold J. Ostrom. USDA For. Serv. Res. Note NC-145, 4 p., illus. 1972.

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As our Nation grows, people expect and need more from their forests — more wood; more water, fish, and wildlife; more recreation and natural beauty; more special forest products and forage. The Forest Service of the U.S. Department of Agriculture helps to fulfill these expectations and needs through three major activities:

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- Participating with all State forestry agencies in cooperative programs to protect, improve, and wisely use our Country's 395 million acres of State, local, and private forest lands.
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